

INSTRUCTIONS AND PARTS MANUAL

CB-1P PLASMA CIRCLE BURNER

Please record your equipment identification information below for future reference. This information can be found on your machine nameplate.

Model Number _____

Serial Number _____

Date of Purchase _____

Whenever you request replacement parts or information on this equipment, always supply the information you have recorded above.

LIT-CB-1P-IPM-0722

Bug-O Systems is committed to empowering our customers by providing operator controlled mechanized solutions for their welding, cutting and custom applications.



B U G - O S Y S T E M S

A DIVISION OF WELD TOOLING CORPORATION



280 TECHNOLOGY DRIVE CANONSBURG, PENNSYLVANIA 15317-9564 USA
PHONE: 412-331-1776 <http://www.bugo.com> FAX: 412-331-0383

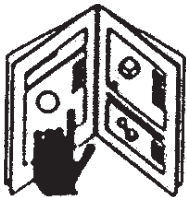
SAFETY

PROTECT YOURSELF AND OTHERS FROM SERIOUS INJURY OR DEATH. KEEP CHILDREN AWAY. BE SURE THAT ALL INSTALLATION, OPERATION, MAINTENANCE AND REPAIR PROCEDURES ARE PERFORMED ONLY BY QUALIFIED INDIVIDUALS.



ELECTRIC SHOCK CAN KILL.

- 1) The equipment is not waterproof. Using the unit in a wet environment may result in serious injury. Do not touch equipment when wet or standing in a wet location.
- 2) The unused connectors have power on them. Always keep the unused connectors covered with the supplied protective panels. Operation of the machine without the protective panels may result in injury.
- 3) Never open the equipment without first unplugging the power cord or serious injury may result.
- 4) Verify the customer supplied power connections are made in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.
- 5) Never remove or bypass the equipment power cord ground. Verify the equipment is grounded in accordance with all applicable local and national electrical safety codes. If none exist, use International Electric Code (IEC) 950.



READ INSTRUCTIONS.

Read the instruction manual before installing and using the equipment.



EQUIPMENT DAMAGE POSSIBLE.

- 1) Do not plug in the power cord without first verifying the equipment is OFF and the cord input voltage is the same as required by the machine or serious damage may result.
- 2) Always verify both the pinion and wheels are fully engaged before applying power or equipment damage may occur.
- 3) Do not leave the equipment unattended.
- 4) Remove from the work site and store in a safe location when not in use.



FALLING EQUIPMENT can cause serious personal injury and equipment damage.

Faulty or careless user installation is possible. As a result, never stand or walk underneath equipment.



MOVING PARTS can cause serious injury.

- 1) Never try to stop the pinion from moving except by removing power or by using the STOP control.
- 2) Do not remove any protective panels, covers or guards and operate equipment.

HIGH FREQUENCY WARNINGS

SPECIAL PRECAUTIONS ARE REQUIRED WHEN USING PLASMA, TIG OR ANY WELDING PROCESS THAT USES HIGH FREQUENCY TO STRIKE AN ARC.



WARNING: HIGH FREQUENCY CAN EFFECT MACHINE OPERATION AND THEREFORE, WELD QUALITY.

Read the precautions below before installing and using the equipment.

PRECAUTIONS:

- 1) Some plasma or welding cables are strong sources of high frequency interference. NEVER lay a plasma or welding cable across the controls of the machine.
- 2) Always physically separate the plasma or welding cable leads from the machine cables. For example, the plasma or welding cable leads should NEVER be bundled with a pendant cable or the machine power cord. Maximize the separation between any machine cables and the plasma or welding cables.
- 3) Strictly follow the grounding procedures specified for the plasma or welding unit. NOTE: Some plasma and welding units produce exceptionally large amounts of high frequency noise. They may require a grounding rod be driven into the earth within six feet (2 meters) of the plasma or welding unit to become compatible with an automatic cutting or welding process.
- 4) If the high frequency is produced using a spark gap, adjust the points so the gap is as small as possible. The larger the gap, the higher the voltage and the higher the interference.
- 5) Some plasma or welding units will inject high frequency interference into the AC power line. Use separate power line branches whenever possible to power the plasma or welding source and the machine. Do not plug them into the same outlet box.
- 6) High frequency noise may enter the machine through the plasma or welding supply remote contactor leads. Some plasma and welding sources can produce noise spikes of up to several thousand volts. These sources are not compatible with automated cutting and welding equipment. It is recommended that the remote contactor leads on these plasma or welding sources not be connected to the machine. An alternate solution is to purchase a separate remote contactor isolation box.

CB-1P CIRCLE BURNER

INSTRUCTIONS AND PARTS MANUAL

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INTRODUCTION

The CB-1P (CBO-1020) Plasma Circle Burner was designed for plasma bevel cutting of one to twelve inch diameter holes and will cut beveled holes in light wall pipe or vessels with wall thickness up to 5/16" (7 mm). An automatic rise and fall cam controls the torch position for saddle cut holes up to 2/3 of work diameter. The cables and air hoses supplying the unit pass through slip rings and O-rings enabling the machine to operate continuously in either direction without cable or hose wrap up. The CB-1P (CBO-1020) Plasma Circle Burner is supplied with a Victor / Thermal Dynamics (CutMaster 82) plasma power source, 180 degree plasma machine torch and 50' (15 m) control cable / torch lead. The CB-1P (CBO-1020) Plasma Circle Burner requires both 220/50-60/1 and 120/50-60/1 to operate. The unit must be mounted on a carriage or fixture.

FEATURES

- 1/12 HP P.M. motor and rotational speed control
- 180 degree plasma machine torch
- 50 ft. (15 m) control cable / torch lead
- Adjustable vertical and horizontal torch positioning system
- Rise and fall cam assembly with 5" (125 mm) of travel
- Brushes and collector rings for plasma current, rated at 200 AMPS
- Brushes and collector rings for all controls, eliminates cable and hose wrap
- Plasma cutting power supply, CutMaster 82 Plus with duty cycles of 65% at 60 AMPS and 100% at 50 AMPS
- Rotation speed and directional controls
- Manual / Off / Automatic control switch

SETUP AND OPERATION:

****All page numbers referred to in this section are from this manual unless otherwise specified.****

POWER SUPPLY:

The CB-1P Plasma Circle Burner is supplied with a modified Thermal Dynamics CutMaster® 82 Plus Plasma Cutting Power Supply. The power supply provides auxiliary power to the CB-1P Plasma Circle Burner for the operation of switches, speed control, and the rotational drive. Refer to the Thermal Dynamics CutMaster® 82 Plus Plasma Cutting Power Supply operating manual #0-4979 supplied with this machine for general operation and set-up information.

PLASMA CUTTING TORCH:

The CB-1P Plasma Circle Burner is equipped with a Thermal Dynamics Plasma Cutting Torch model PCM-120 machine torch. Refer to the Thermal Dynamics Plasma Cutting Torch instruction manual #0-2818 supplied with this machine for general operation and set-up information.

FIXTURING:

All circle burners have to be fixtured in some manner from the top of the shaft. This may be achieved in one of the following: column & boom, manipulator, or carriage & monorail.

CABLE CONNECTIONS:

The CB-1P Plasma Circle Burner is equipped with a Junction Box Assembly (CWO-3035), shown on page 17. The Junction Box Assembly is supplied with five leads that need to be connected as described below.

Connect:

- Plasma Box Cable Assembly to the terminal connector in the main gear at the top of the machine.
- Air Hose Assembly to the hose fitting in the top of the CB-1P Shaft Assembly item (11) on page 13.
- Low Frequency Power Cable to the Low Frequency Power Cable.
- High Frequency Power cable to the High Frequency Power Cable.
- The Power Supply Torch Lead (air, control cable, high frequency) to the power supply.
- It is helpful to mount the Junction Box assembly to the top of the carriage or to the manipulator.

RISE AND FALL OF THE CAM:

All circle burners are equipped with a rise and fall cam assembly. The cam assembly must be aligned before any other settings can be made. To align the cam on the machine, align the horizontal rack parallel to the pipe, then adjust the gun holder so it is perpendicular to the horizontal rack. Loosen the set screws in the brass block on the cam, and rotate the cam to the vertical position as shown.

SETTING THE CAM:

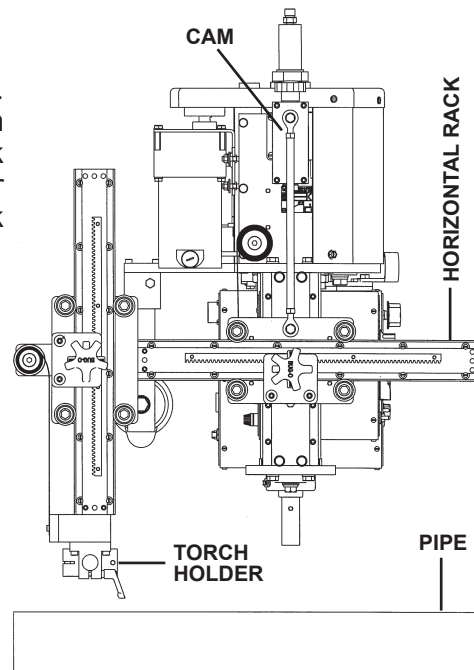
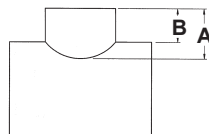
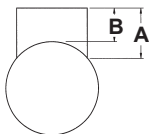
The cam setting is equal to the distance "B" subtracted from the distance "A".

EXAMPLE:

Let A=3 and B=2

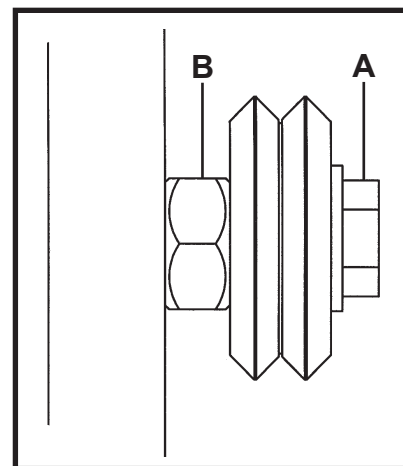
$3-2=1$

The cam setting is 1.



WHEEL ADJUSTMENT:

The CB-1P Racking System (CWO-1670) and the Small Vertical Racker (CWO-1685) are equipped with adjustable wheels. Always check these components for proper wheel adjustment before using the machine. The wheels need adjustment if you can cock or wiggle the components out of alignment. The wheels should be snug but not prohibit movement along the path of travel. The wheels with the hex stand off are adjustable. To adjust the wheels loosen the hex bolt (A) until the adjustable bushing (B) can be rotated. Correct the wheel alignment by rotating the adjustable bushing (B). Once adjusted, hold the adjustable bushing (B) while tightening the hex bolt (A). Recheck alignment.



MACHINE CONTROLS:

Operational parameters can be set using the two control boxes attached to the machine as well as the controls located on the power supply. Please refer to the sections in this manual.

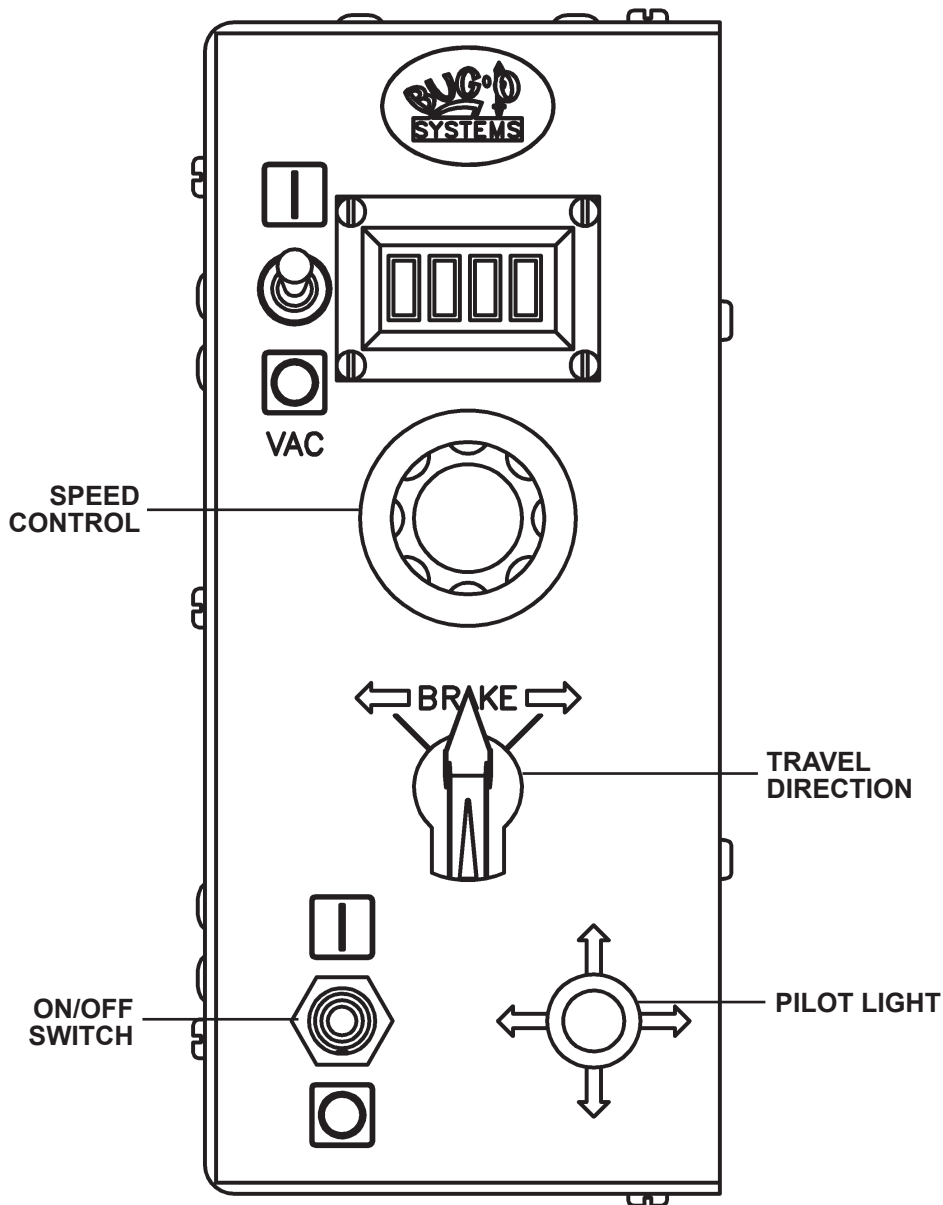
- CWO-3951 Plasma Controls for descriptions of the control capabilities.
- CWO-6210 Rotation Control for descriptions of the various speed and directional capabilities.
- CWO-7655 Power Source Controls for descriptions of the power supply controls.

MAKING A CUT:

1. Position the torch to the starting location using the Racking System (CWO-1670). Ensure that the torch is at the appropriate position, standoff distance and angle.
2. Connect the ground cable to the work piece. The ground cable must make good electrical contact with the work.
3. With the Arc "ON/OFF" switch in the "OFF" position and the "HAND/OFF/AUTO" switch in the "HAND" position, set the rotation direction and speed.
4. With the Arc "ON/OFF" switch in the "ON" position the cutting process and rotation are both started by throwing the "HAND/OFF/AUTO" switch to the "AUTO" position.
5. To stop the cutting processes and rotation, throw the "HAND/OFF/AUTO" switch to the "OFF" position.

WARNING: THIS MACHINE PRODUCES PLASMA ARC RAYS, IT IS NECESSARY TO USE CORRECT EYE, HEAD, AND BODY PROTECTION.

CWO-6210 ROTATION CONTROLS



SPEED CONTROL:

Controls the speed in which the machine travels. The depicted lines 0 to 100 should not be construed as inches per minute of travel. They should be considered as reference points only.

TRAVEL DIRECTION:

Controls the direction in which the machine will travel. Select the left arrow for clockwise rotation, brake for stop, and the right arrow for counter-clockwise rotation.

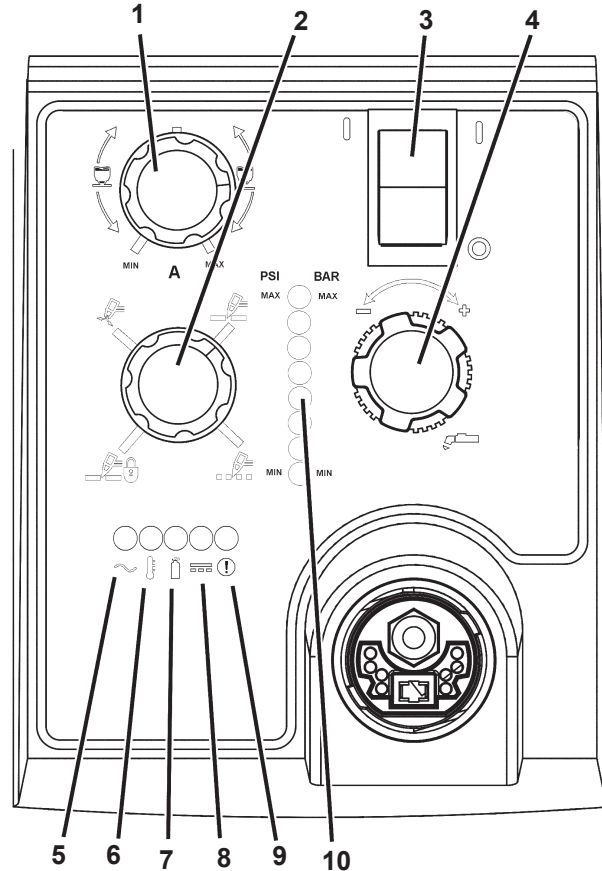
ON / OFF SWITCH:

The On / Off switch enables / disables power to the rotation control box.

PILOT LIGHT:

The Pilot Light indicates whether the machine is on / off as dictated by the on / off switch.

CWO-7655 CB-1P POWER SUPPLY CONTROLS



Thermal Dynamics, Art# A-07886

1. OUTPUT CURRENT CONTROL

The Current Control is used to set the desired output current, the current can be adjusted from 15-60 amps. For drag cutting applications, the current should not exceed 60 amps.

2. FUNCTION CONTROL

The Function Control knob is used to select between four operating modes -- Set, Run, Rapid Auto Restart, and Latch. **SET** is used for setting gas pressure and purging lines. **RUN** is used for torch operation. **RAPID AUTO RESTART** allows for faster restarting of the Pilot Arc for uninterrupted cutting. The **LATCH** is used for specific applications, generally hand held cuts.

3. ON / OFF POWER SWITCH:

Controls input power to the power supply. Up is ON, down is OFF.

4. AIR / GAS PRESSURE CONTROL:

Used in the SET mode to adjust the air/gas pressure. Pull knob out to adjust, then push in to lock.

5. AC INDICATOR:

Steady light indicates power supply is ready for operation. Blinking light indicates interlock mode. Refer to power supply operation manual for more instructions.

6. TEMP INDICATOR:

Indicator will light when power supply internal temperature is above the normal operational limits. Let unit cool before continuing operation.

7. GAS INDICATOR:

Indicator will light when minimum input gas pressure for power supply operation is present. This may not be enough pressure for torch operation.

8. DC INDICATOR:

Indicator will light while the torch switch is pressed.

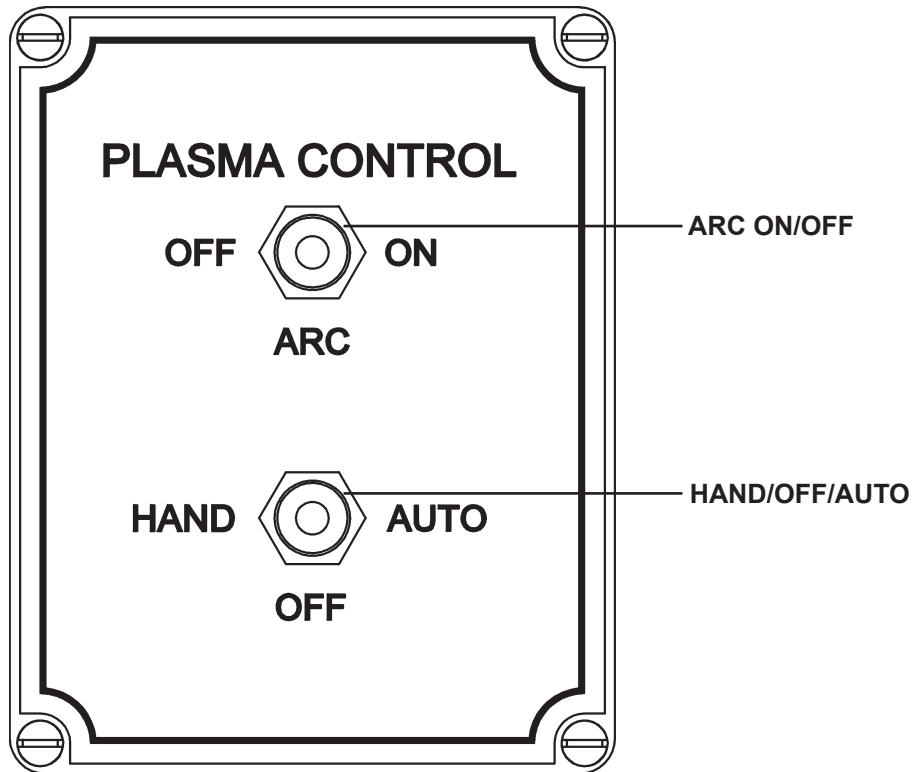
9. FAULT ERROR INDICATOR:

Indicator is ON when fault circuit is active. Refer to power supply operation manual for more instructions.

10. PRESSURE INDICATORS:

Indicator will light according to pressure that was set using Pressure Control Knob.

CWO-3951 PLASMA CONTROLS



ARC ON/OFF:

The **OFF** position disables the cutting process, allowing machine rotation without starting the cutting process when the **HAND/OFF/AUTO** switch is thrown to the **HAND** position. The **ON** position enables the cutting process when the **HAND/OFF/AUTO** switch is thrown to the **AUTO** position.

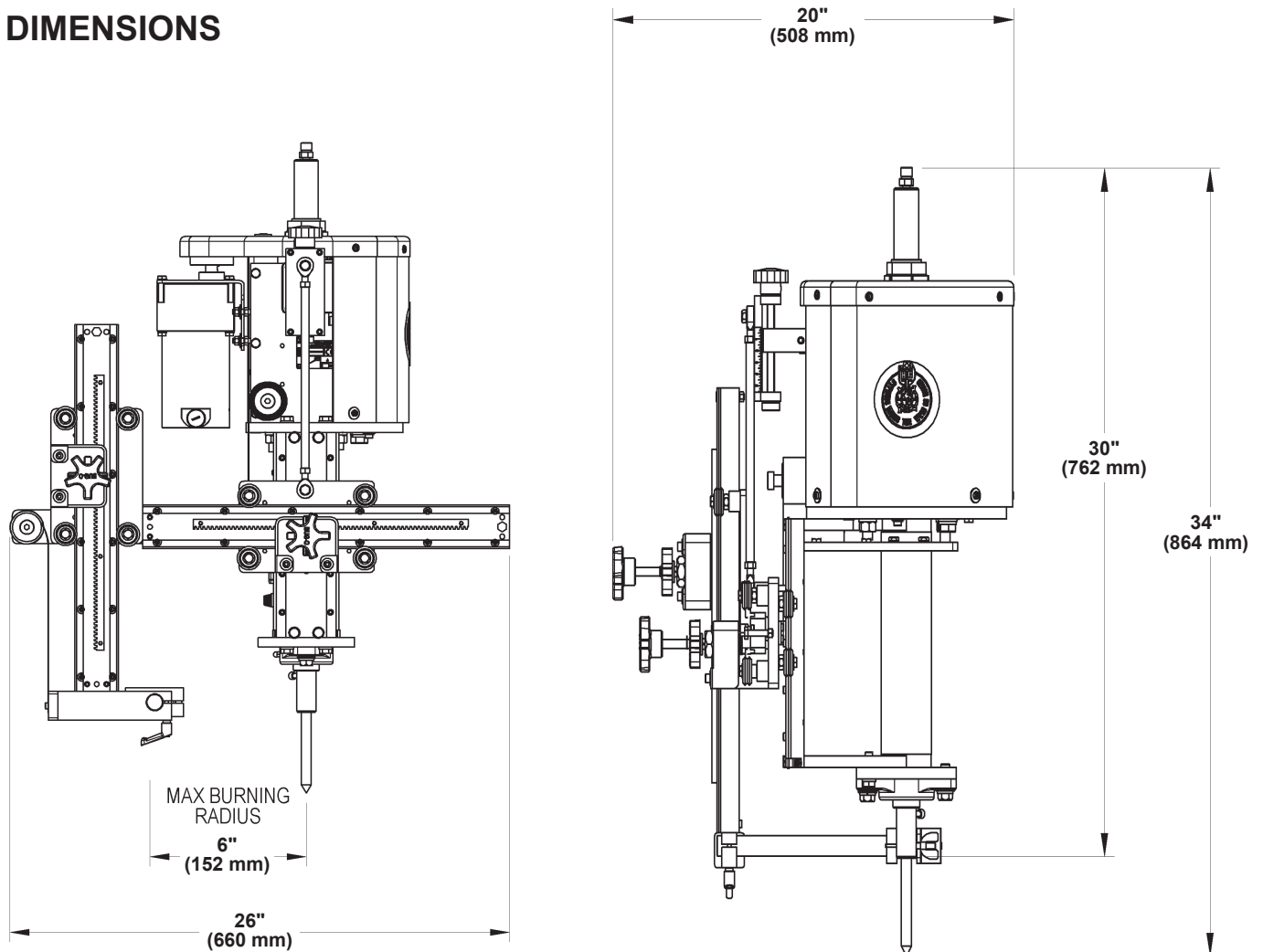
HAND/OFF/AUTO:

The **HAND** position allows the operator to rotate the machine when the **ARC ON/OFF** switch is in the **OFF** position to check torch position as well as the cam setting. The **AUTO** position will start the entire cutting operation based on the operator's settings including machine rotation when the **ARC ON/OFF** switch is in the **ON** position. The **OFF** position will stop the entire cutting process including machine rotation.

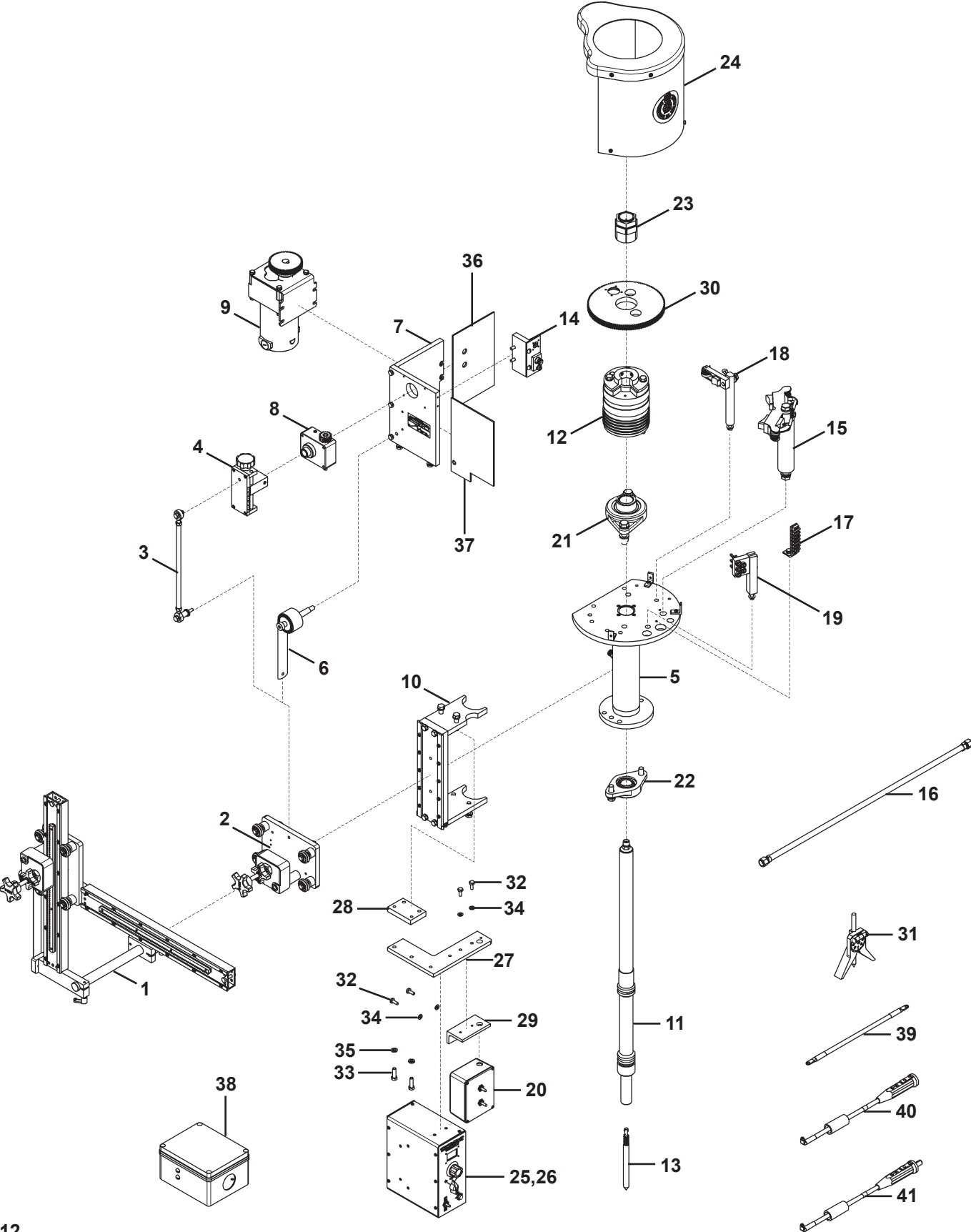
TECHNICAL DATA

Amperage:	15-60 AMPS
Input Voltage:	208/440 VAC 50/60 Hz single or three phase 120 VAC 50/60 Hz single or three phase
Rotation Speed:	0.2-11 rpm
Cam Range:	5" (125 mm)
Burning Diameter:	1-12" (25-300 mm)
Machine Weight:	170 lbs. (77 kg)
Power Source Weight:	73.5 lbs. (33 kg)
Shipping Weight:	283.5 lbs. (129 kg)

DIMENSIONS



CBO-1020-NPS, CBO-1020- CB-1P PLASMA CIRCLE BURNER / PARTS LIST

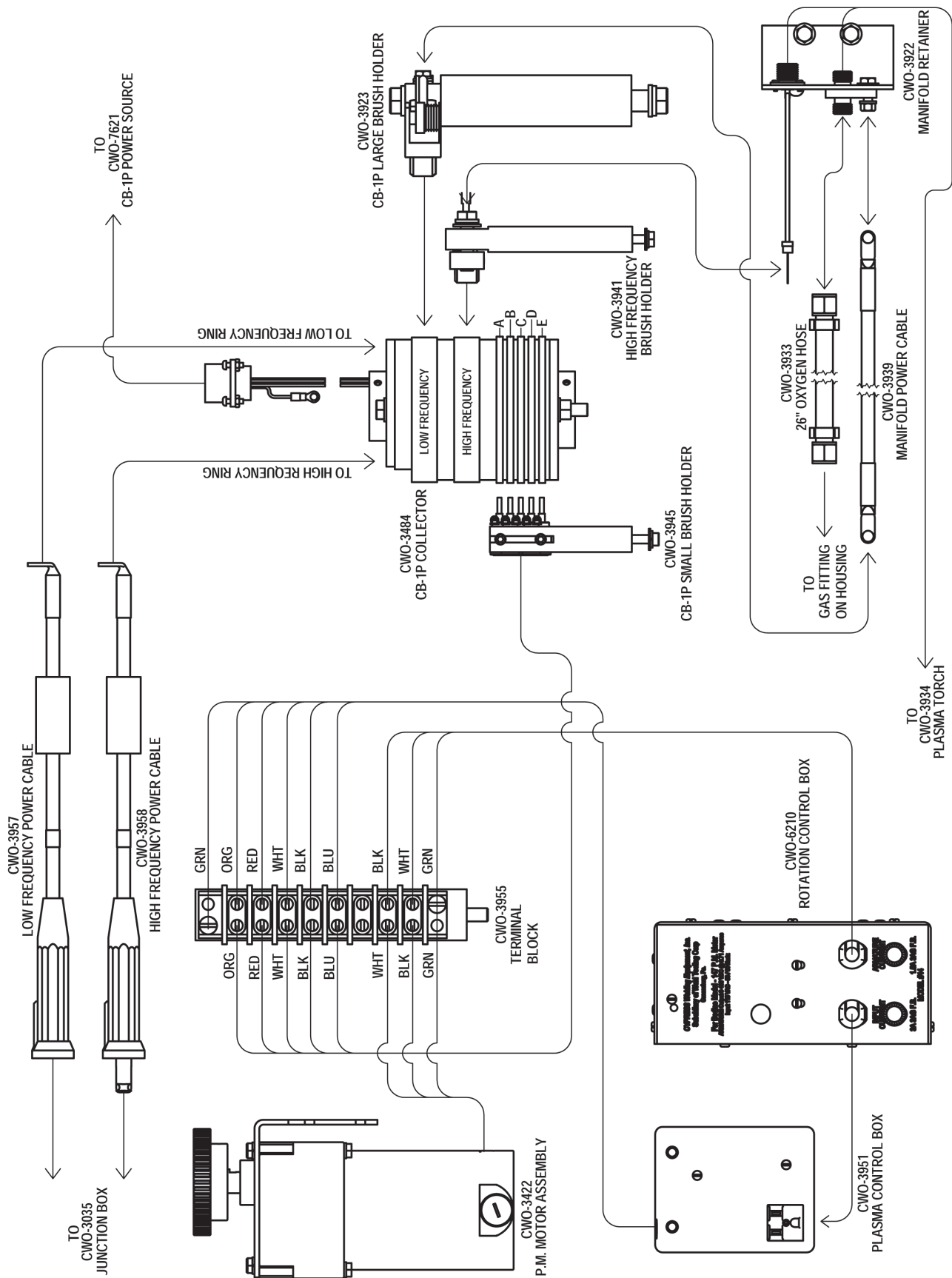


CBO-1020-NPS, CBO-1020- CB-1P PLASMA CIRCLE BURNER / EXPLODED VIEW

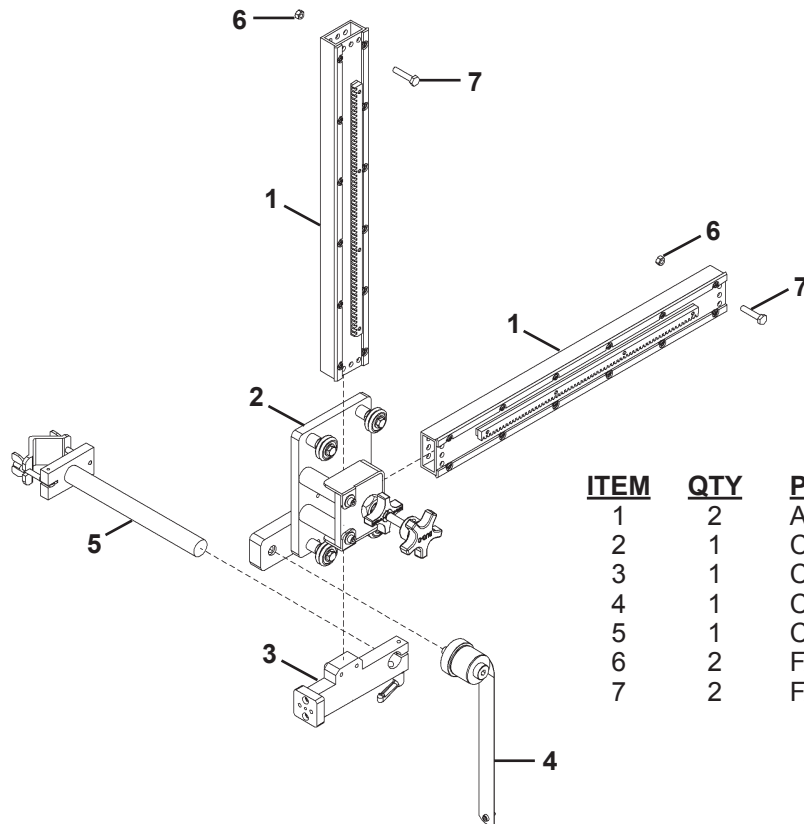
<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CBO-1670	Racking System
2	1	CWO-1685	Small Horizontal Racker
3	1	CWO-3004	Cam Shaft & Spacer Assembly
4	1	CWO-3005	5" Cam Assembly
5	1	CWO-3199	Housing Assembly
6	1	CWO-3399	Load Spring Assembly
7	1	CWO-3417	Motor & Transmission Plate Assembly
8	1	CWO-3418	Transmission
9	1	CWO-3422	P.M. Motor 157
10	1	CWO-3466	Slide Bar Mounting Assembly
11	1	CWO-3483	Shaft Assembly CB-1P
12	1	CWO-3484	CB-1P Collector Ring Assembly
13	1	CWO-3516	CB-1P Pointer Assembly
14	1	CWO-3922	Manifold & Retainer Assembly
15	1	CWO-3923	CB-1P Large Brush Assembly
16	1	CWO-3933	26" Air Hose Assembly
17	1	CWO-3955	Terminal Block Assembly
18	1	CWO-3941	High Frequency Brush Assembly
19	1	CWO-3945	CB-1P Small Brush Holder
20	1	CWO-3951	Plasma Control Box
21	1	CWO-4050	1" Bearing w/Fasteners
22	1	CWO-4060	1-1/4" Bearing w/Fasteners
23	1	CWO-5075	1-1/4" ID Trantorque
24	1	CWO-5220	Guard Assembly
25	1	CWO-6210	Rotation Control Box
26	1	CWO-6110-L	Rotation Control Mounting
27	1	CWO-6423	CB-1P Control "L" Bracket
28	1	CWO-6424	CB-1P Control MT. Spacer
29	1	CWO-6426	Plasma Control MT. Bracket
30	1	CWO-9037	CB-1P 7-1/8" Diameter Gear
31	1	CWO-9482	Centering Head Tool
32	4	FAS-0356	Hex Hd Cap Scr 1/4-20 x 5/8"
33	2	FAS-0379	Hex Hd Cap Scr 5/16-18 x 1"
34	4	WAS-0243	1/4" Split Lock Washer
35	2	WAS-0251	5/16" Split Lock Washer
36	1	CWO-4849	Motor Mt. Plt. Insulator
37	1	CWO-4848	Trans. Plate Insulator
38	1	CWO-3035	Junction Box Assembly Plasma
39	1	CWO-3939	Manifold Power Cable
40	1	CWO-3957	Low Frequency Power Cable
41	1	CWO-3958	High Frequency Power Cable

Note: 1. See CBO-1020-NPS for wiring and cable information. (Page 14)
2. CWO-3934 is the plasma replacement torch. (Page 29)

CBO-1020-NPS CB-1P PLASMA CIRCLE BURNER / WIRING DIAGRAM

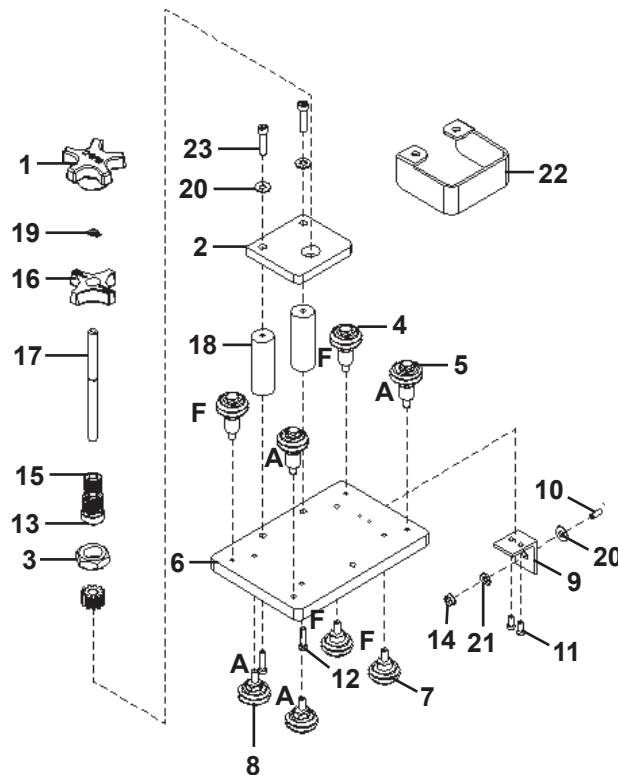


CBO-1670 RACKING SYSTEM / EXPLODED VIEW / PARTS LIST



ITEM	QTY	PART NO.	DESCRIPTION
1	2	ABR-1070	V-Guide Ways 19"
2	1	CWO-1675	Vertical Racker
3	1	CWO-1695	Attachment Block
4	1	CWO-3450	10.6# Load Spring Assembly
5	1	CBO-1675	Torch Clamp Assembly
6	2	FAS-1351	Hex Nut 1/4-20
7	2	FAS-2351	Hex Hd Cap Scr 1/4-20 x 1-1/4"

CWO-1685 SMALL HORIZONTAL RACKER / EXPLODED VIEW / PARTS LIST



ITEM	QTY	PART NO.	DESCRIPTION
1	1	BUG-2032	Knob, Black
2	1	CWO-1678	Racker Plate
3	1	CWO-1679	Pinion 11T
4	2	CWO-1680	W2 Fixed Leg & Wheel Assy.
5	2	CWO-1681	W2 Adj. Leg & Wheel Assy.
6	1	CWO-1686	Mount Plate (Small Racker)
7	2	CWO-4020	Fixed Leg & Wheel Assy.
8	2	CWO-4021	Adj. Leg & Wheel Assy.
9	1	CWO-4112	Bracket
10	1	FAS-0355	Hex Hd Cap Scr 1/4-20 x 1/2"
11	2	FAS-0534	Soc Hd Cap Scr 10-24 x 3/8"
12	4	FAS-0557	Soc Hd Cap Scr 1/4-20 x 3/4"
13	1	FAS-1307	Hex Jam Nut 3/4-16
14	1	FAS-1351	Hex Nut 1/4-20
15	1	MUG-1141	Bearing Collet
16	1	MUG-1142	Knob, Locking
17	1	MUG-1144	Shaft
18	2	MUG-1453	Stand-Off
19	1	MUG-1579	Retaining Ring
20	3	WAS-0240	1/4" SAE Washer
21	1	WAS-0243	1/4" Split Lock Washer
22	1	CWO-1671	Racker Shield
23	2	FAS-0559	Soc Hd Cap Scr 1/4-20 x 1"

F = Fixed Wheel Placement

A = Adjustable Wheel Placement

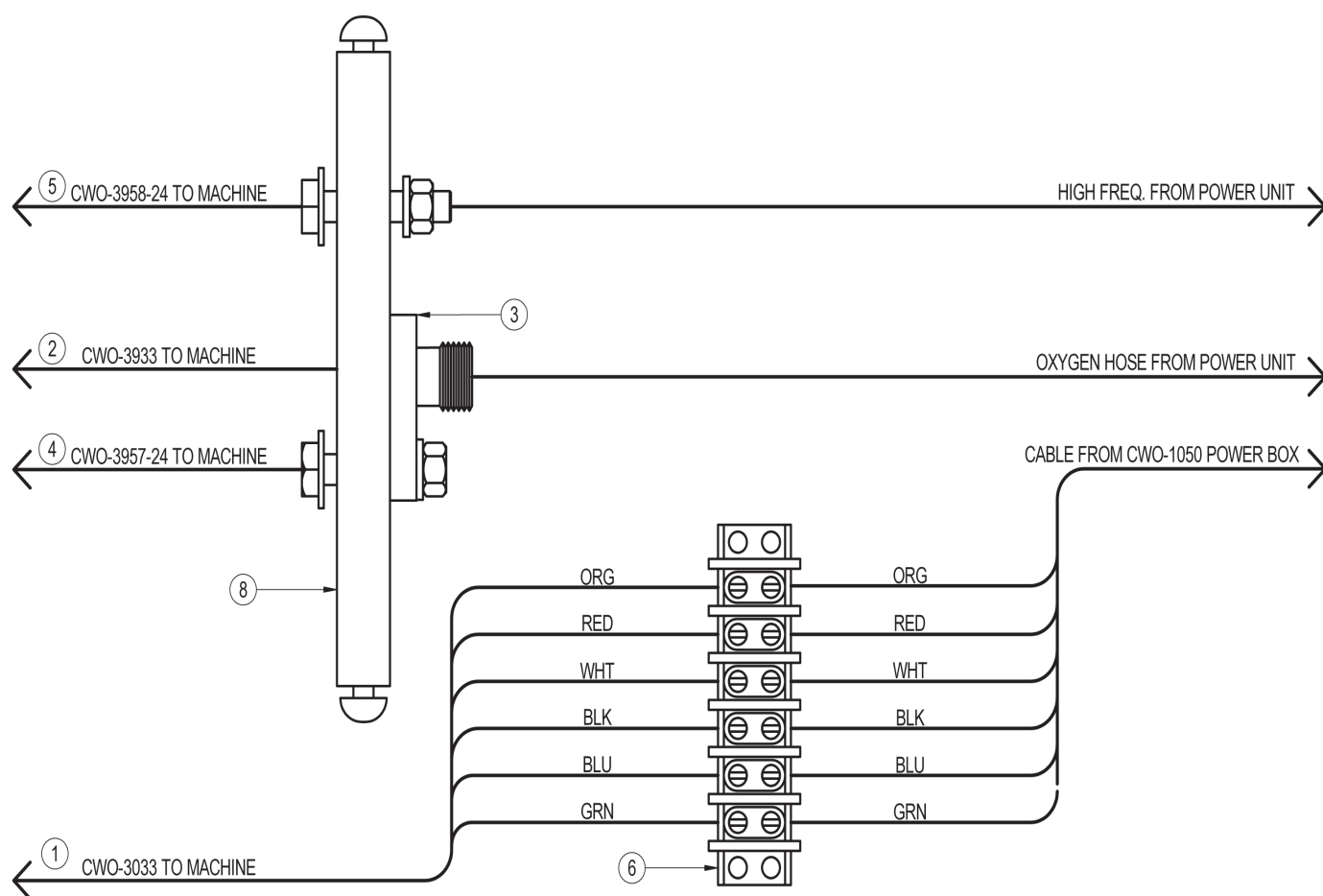
CWO-3004 CAM SHAFT & SPACER ASSEMBLY / EXPLODED VIEW / PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-4073	Ball Joint Rod End 5/16-24 RH
2	1	CWO-5019	Ball Joint Rod End 5/16-24 LH
3	1	CWO-9078	Spacer 1/2" O.D. x 5/16 I.D. x 3/4"
4	1	CWO-9357	Cam Shaft Tube
5	1	FAS-0377	Hex Hd Cap Scr 5/16-18 x 3/4"
6	1	FAS-1380	Hex Nut 5/16-24
7	1	FAS-1381	Hex Nut 5/16-24 LH
8	1	FAS-2375	Hex Hd Cap Scr 5/16-18 x 2"
9	3	WAS-0250	5/16 SAE Washer

CWO-3005 5" CAM ASSEMBLY / EXPLODED VIEW / PARTS LIST

ITEM	QTY	PART NO.	DESCRIPTION
1	2	BUG-2098	Delrin Washer 3/8" I.D.
2	1	BUG-9012	Locking Collar
3	1	CWO-4026	Base Plate 5" Cam
4	2	CWO-4027	End Plate 5" Cam
5	1	CWO-4028	Center Block 5" Cam
6	1	CWO-4029	Screw 5" Cam
7	2	CWO-4031	Rod 5" Cam
8	1	CWO-4032	Knob
9	1	CWO-5199	Scale
10	4	FAS-0434	Set Scr 10-24 x 3/8"
11	1	FAS-0444	Set Scr 10-32 x 3/8"
12	2	FAS-0495	Set Scr 3/8-16 x 1/2"
13	4	FAS-0534	Soc Hd Cap 10-24 x 3/8"

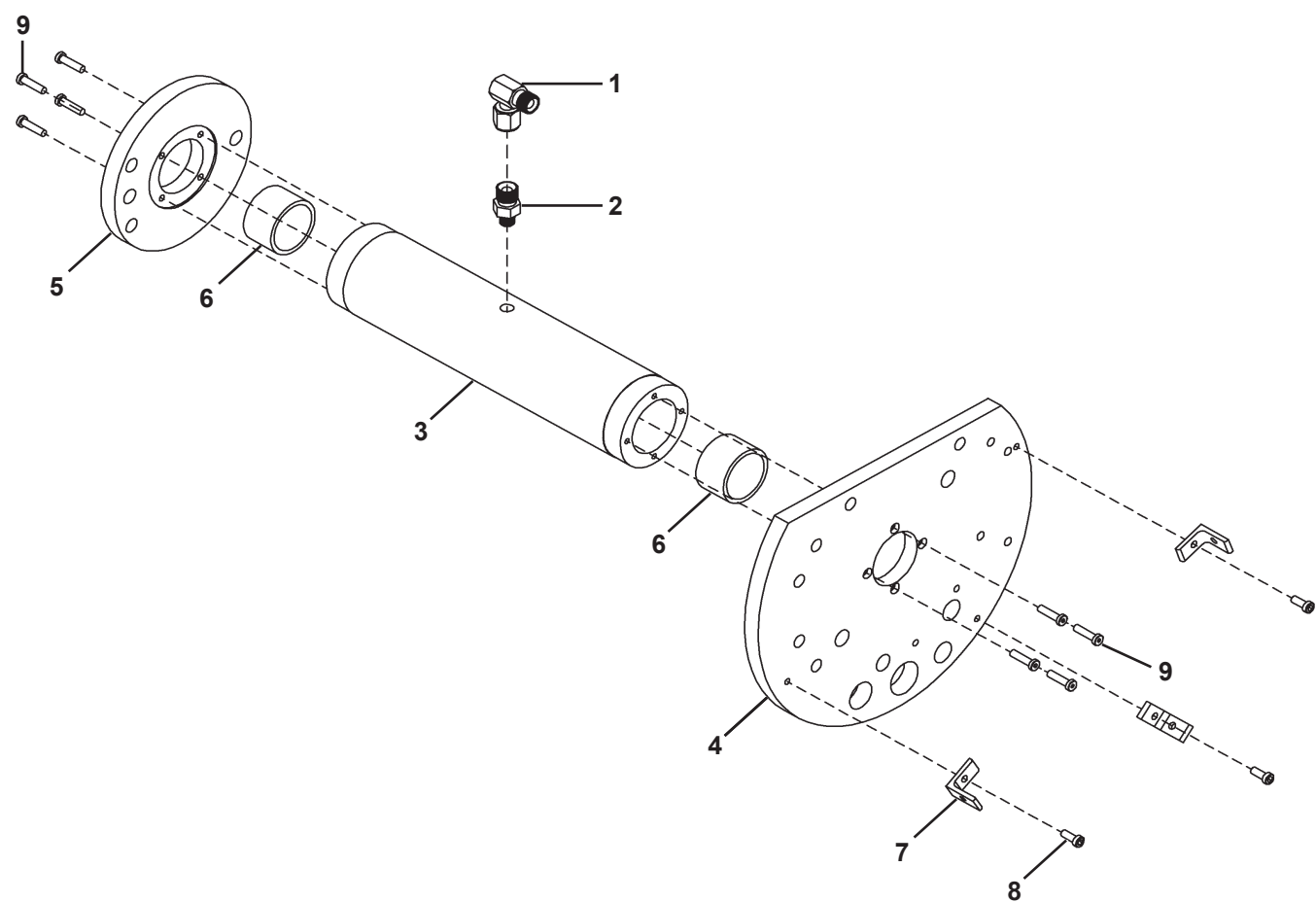
CWO-3035 JUNCTION BOX ASSEMBLY / PARTS LIST / WIRING DIAGRAM



ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-3033	Cable Assembly., Plasma Box
2	1	CWO-3933	20" Oxygen Hose Assembly
3	1	CWO-3938	Hose Coupling Assembly
4	1	CWO-3957-24	24" Low Frequency Power Cable
5	1	CWO-3958-24	24" High Frequency Power Cable
6	1	CWO-6288	Terminal Block (6)
7*	1	CWO-6771	Machined Enclosure & Cover
8	1	CWO-6772	JB Support Block
9*	2	CWO-6767	Cord Grip 1-1/4 Wire
10	4	FAS-0235	Rnd Hd Scr 10-24 x 1/2"
11*	4	FAS-0527	Soc Hd Cap Scr 8-32 x 3/4"
12	1	FAS-0359	Hex Hd Cap Scr 1/4-20 x 1"
13*	2	FAS-0915	Flt Hd Soc Scr 6-32 x 1/2"
14*	2	FAS-1310	Hex Nut 6-32
15	2	FAS-1351	Hex Nut 1/4-20
16	1	FAS-2351	Hex Hd Cap Scr 1/4-20 x 1-1/4"
17	2	WAS-0240	1/4" SAE Washer
18	2	WAS-0243	1/4" Split Lock Washer

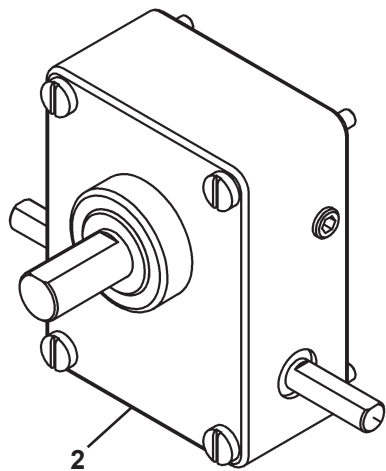
* NOT SHOWN FOR CLARITY

CWO-3199 HOUSING ASSEMBLY / EXPLODED VIEW / PARTS LIST

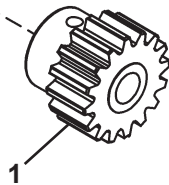


ITEM	QTY	PART NO.	DESCRIPTION
1	1	BUG-1296	90 Degree Hose Adaptor
2	1	CWO-4226	Outlet Bushing
3	1	CWO-5837	Center Tube Housing
4	1	CWO-5843	Top Housing Plate CW-5
5	1	CWO-5846	Lower Housing Plate CW-5
6	2	CWO-5975	Insert 1-5/8" O.D. x 1.376" I.D. x 1"
7	3	CWO-9339	Angle For Guard
8	3	FAS-0535	Soc Hd Cap Scr 10-24 x 1/2"
9	8	FAS-0548	Soc Hd Cap Scr 10-32 x 3/8"

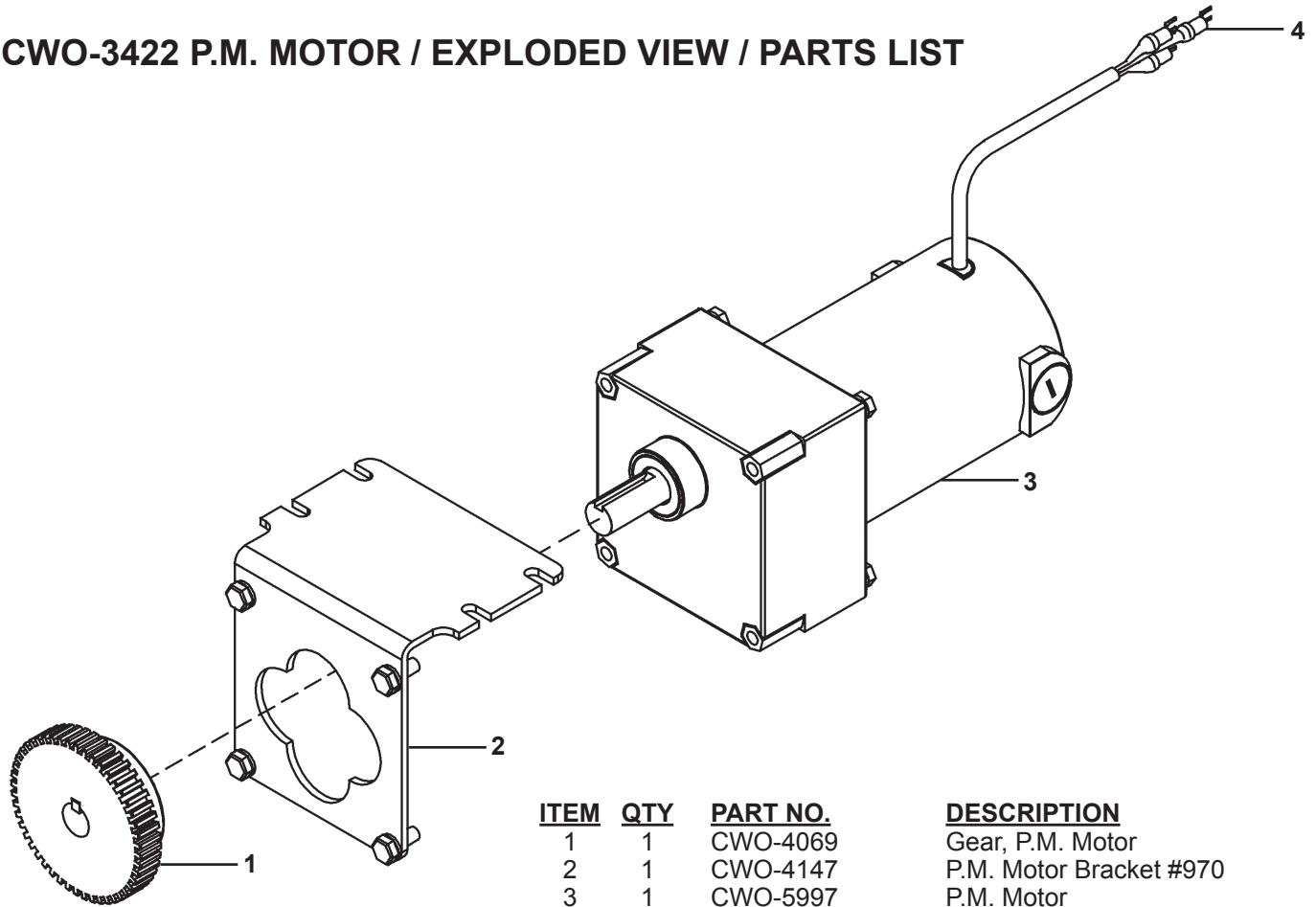
CWO-3418 TRANSMISSION / EXPLODED VIEW / PARTS LIST



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-3276	Pinion Gear Assembly
2	1	CWO-4068	Transmission SW 3.5:1

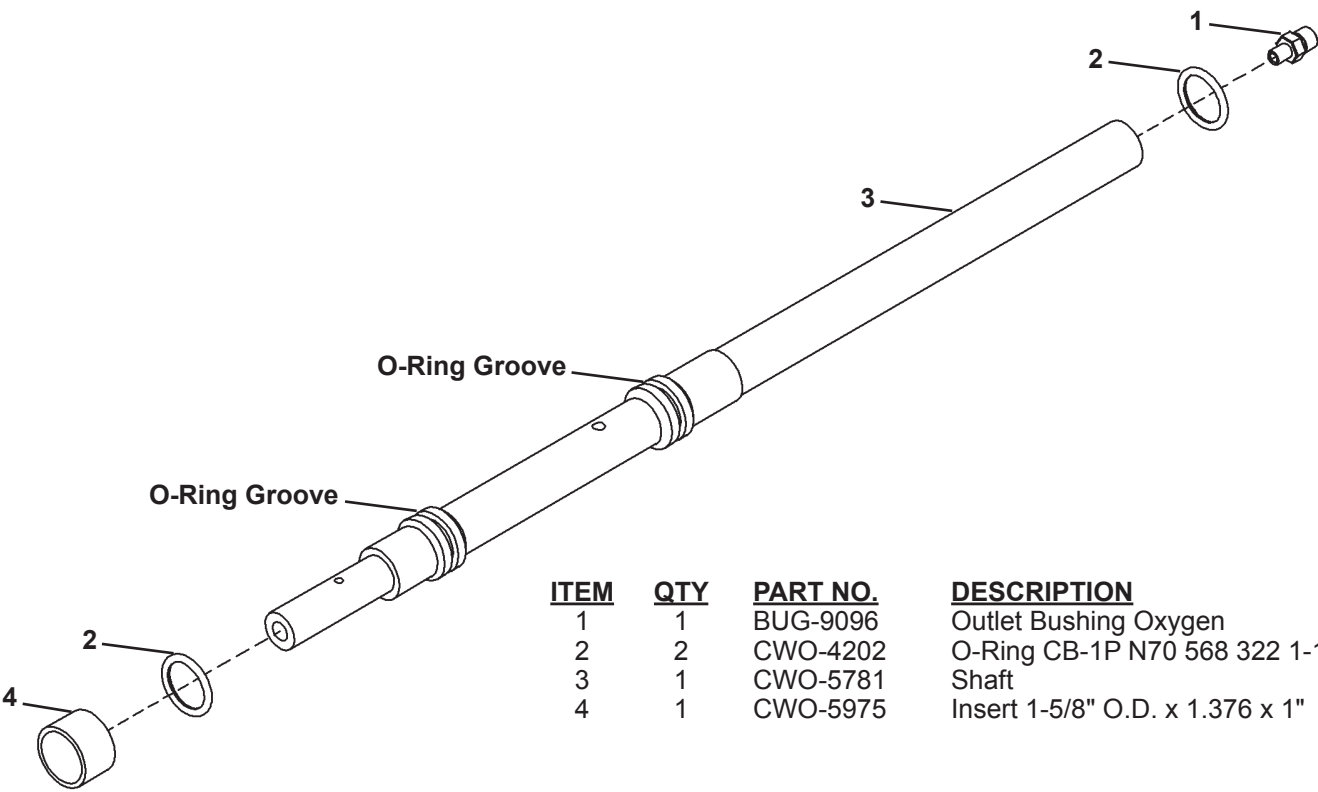


CWO-3422 P.M. MOTOR / EXPLODED VIEW / PARTS LIST

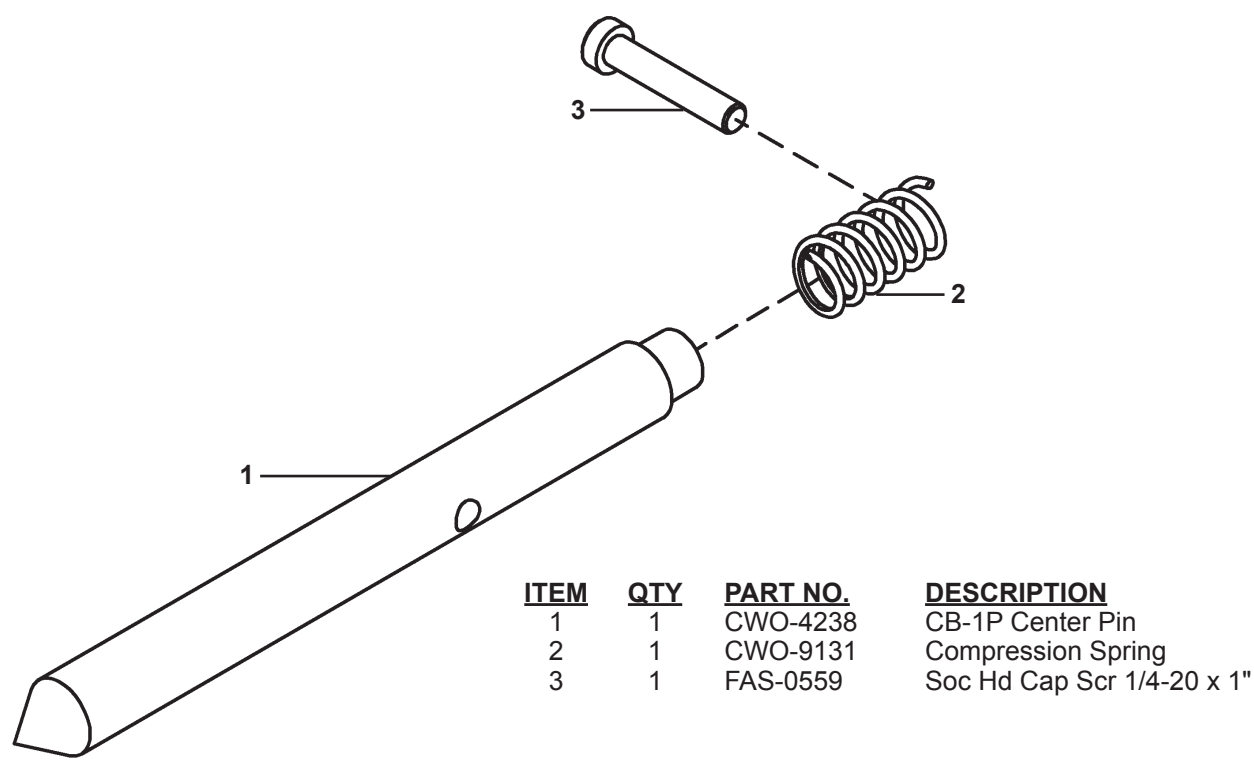


<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-4069	Gear, P.M. Motor
2	1	CWO-4147	P.M. Motor Bracket #970
3	1	CWO-5997	P.M. Motor
4	3	TERM-WTE-1508	#8 Fork Blue 14RB-8FL T&B

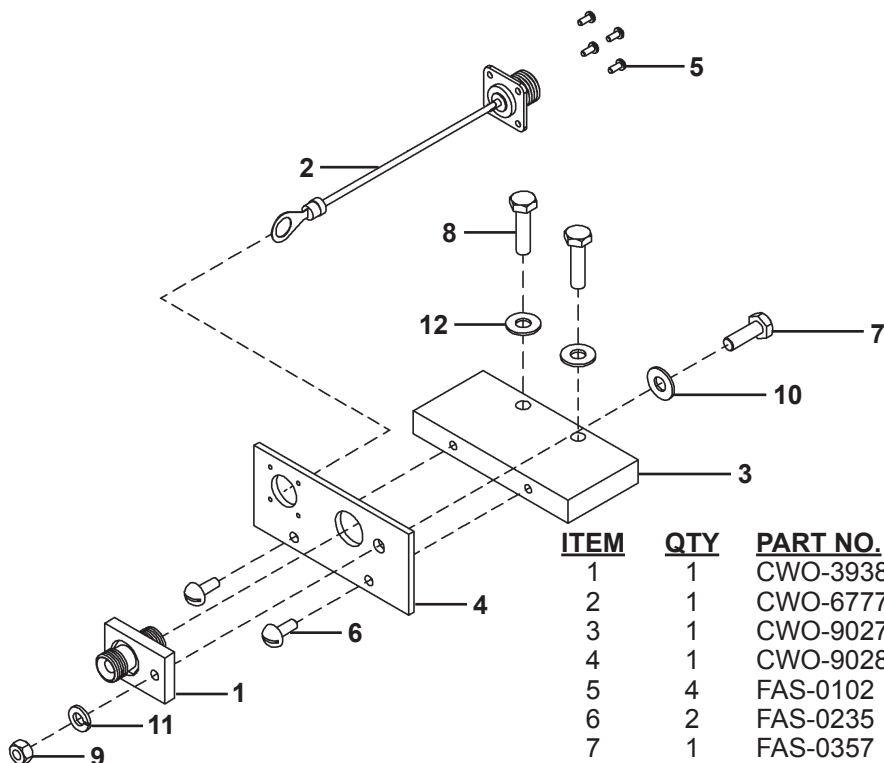
CWO-3483 SHAFT ASSEMBLY CB-1P / EXPLODED VIEW / PARTS LIST



CWO-3516 CB-1P POINTER ASSEMBLY / EXPLODED VIEW / PARTS LIST

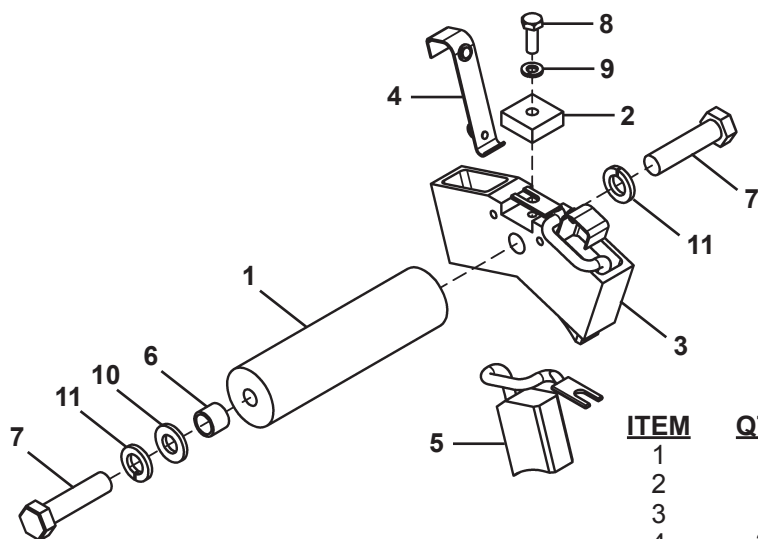


CWO-3922 MANIFOLD AND RETAINER / EXPLODED VIEW / PARTS LIST



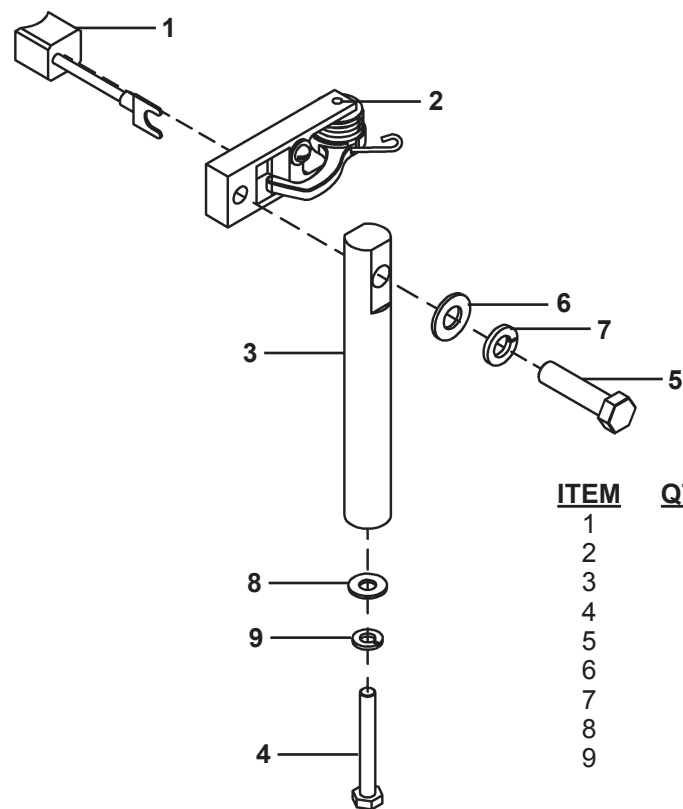
ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-3938	Hose Coupling Assembly
2	1	CWO-6777	Coaxial Panel Recp. Assembly
3	1	CWO-9027	1/2" Support Plate
4	1	CWO-9028	1/8" Support Plate
5	4	FAS-0102	Pan Hd Scr 4-40 x 1/4"
6	2	FAS-0235	Rnd Hd Scr 10-24 x 1/2"
7	1	FAS-0357	Hex Hd Cap Scr 1/4-20 x 3/4"
8	2	FAS-0359-N	Hex Hd Cap Scr 1/4-20 x 1"
9	1	FAS-1351	1/4-20 Hex Nut
10	1	WAS-0240	1/4" SAE Washer
11	1	WAS-0243	1/4" Split Lock Washer
12	2	BUG-2063	1/4" Delrin Washer

CWO-3923 CB-1P LARGE BRUSH ASSEMBLY / EXPLODED VIEW / PARTS LIST



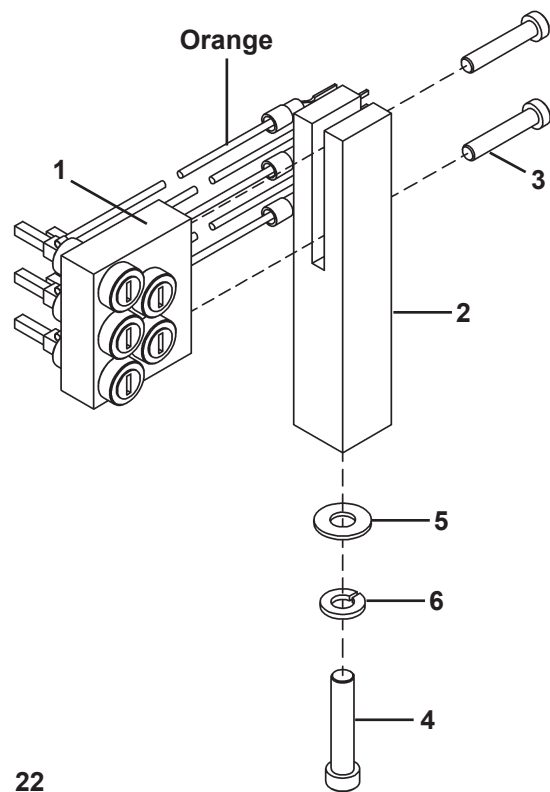
ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-7624	Large Brush Holder Support
2	1	CWO-3266	Attachment Bar
3	1	CWO-3263	Large Brush Holder
4	2	CWO-3264	Spring Clip
5	2	CWO-4337	Large Brush 1-1/2" x 3/4" x 2"
6	1	CWO-5550	Micarta Bushing
7	2	FAS-0305	Hex Hd Cap Scr 1/2-13 x 2"
8	1	FAS-0357	Hex Hd Cap Scr 1/4-20 x 3/4"
9	1	WAS-0243	1/4" Split Lock Washer
10	1	WAS-0280	1/2" SAE Flat Washer
11	2	WAS-0281	1/2" Split Lock Washer

CWO-3941 HIGH FREQUENCY BRUSH / EXPLODED VIEW / PARTS LIST

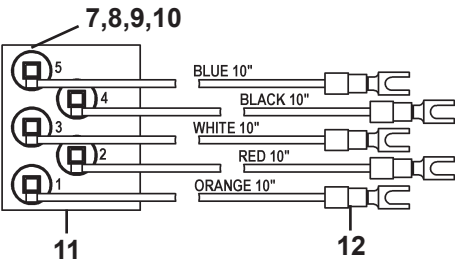


ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-5833	Brush 3/4" Sq. x 3/4" LG.
2	1	CWO-5849	Brush Holder, 3/4" Sq. Brush
3	1	CWO-7625	Hi-Freq. Brush Holder Support
4	1	FAS-2355	Hex Hd Cap Scr 1/4-20 UNC x 2"
5	1	FAS-2393	Hex Hd Cap Scr 3/8-16 x 1-1/2"
6	1	WAS-0260	3/8" Washer
7	1	WAS-0262	3/8" Split Lock Washer
8	1	WAS-0240	1/4" Washer
9	1	WAS-0243	1/4" Lockwasher

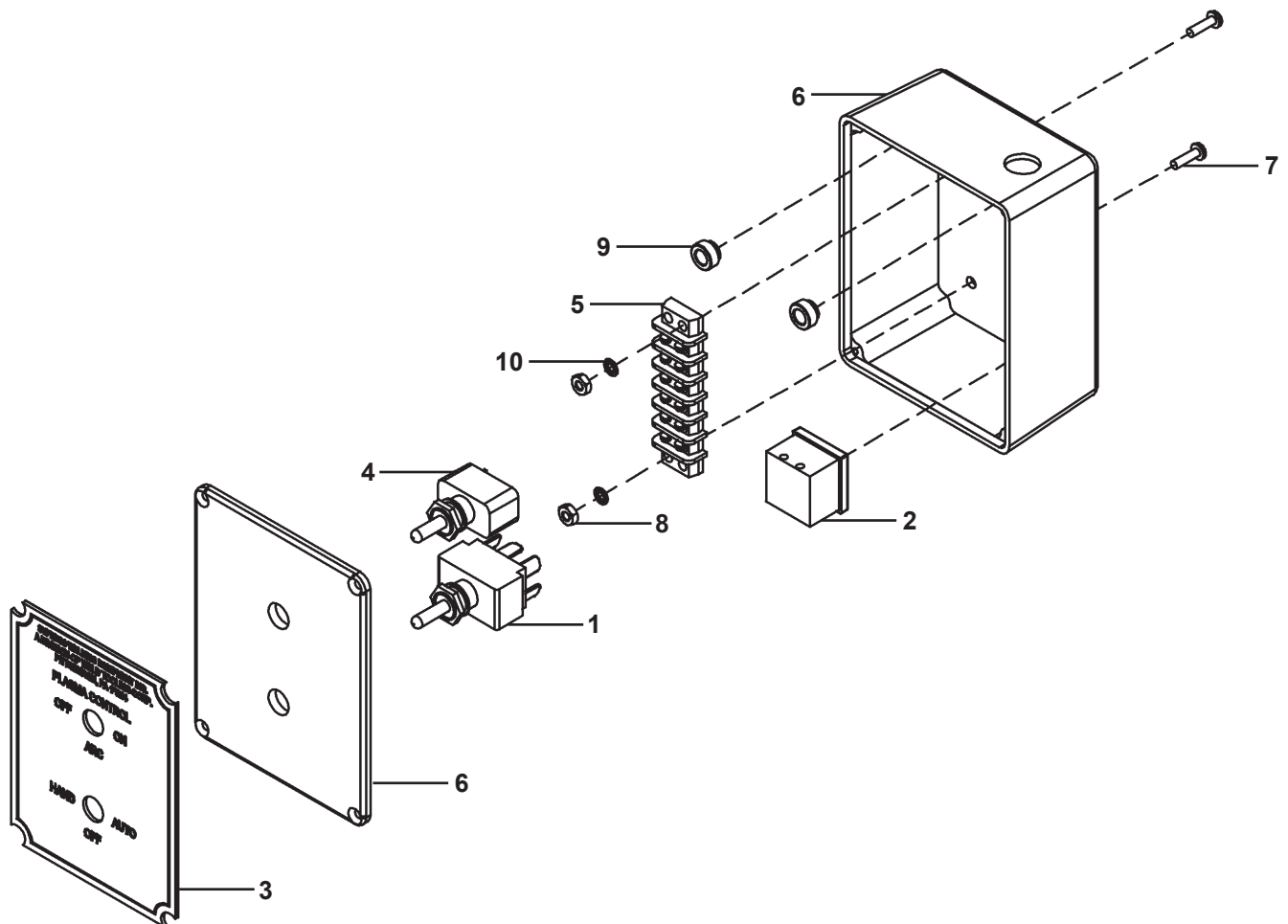
CWO-3945 CB-1P SMALL BRUSH HOLDER / EXPLODED VIEW / PARTS LIST



ITEM	QTY	PART NO.	DESCRIPTION
1	1	CWO-3464	Small CB-1P Retainer Assembly
2	1	CWO-9076	Retainer Support (Small)
3	2	FAS-0539	Soc Hd Cap Scr 10-24 x 1" LG
4	1	FAS-2551	Soc Hd Cap Scr 1/4-20 x 1-1/4" LG
5	1	WAS-0240	1/4" SAE Washer
6	1	WAS-0243	1/4" Split Lock Washer
7	5	CWO-5831	1/8" x 1/8" x 7/8" LG Brush
8	5	CWO-5874	1/8" Brush Holder
9	5	CWO-5875	Cap
10	5	CWO-5876	Clip
11	1	CWO-7609	CB-1P Small Brush Retainer
12	5	TERM WTE 0602	#6 Fork Blue

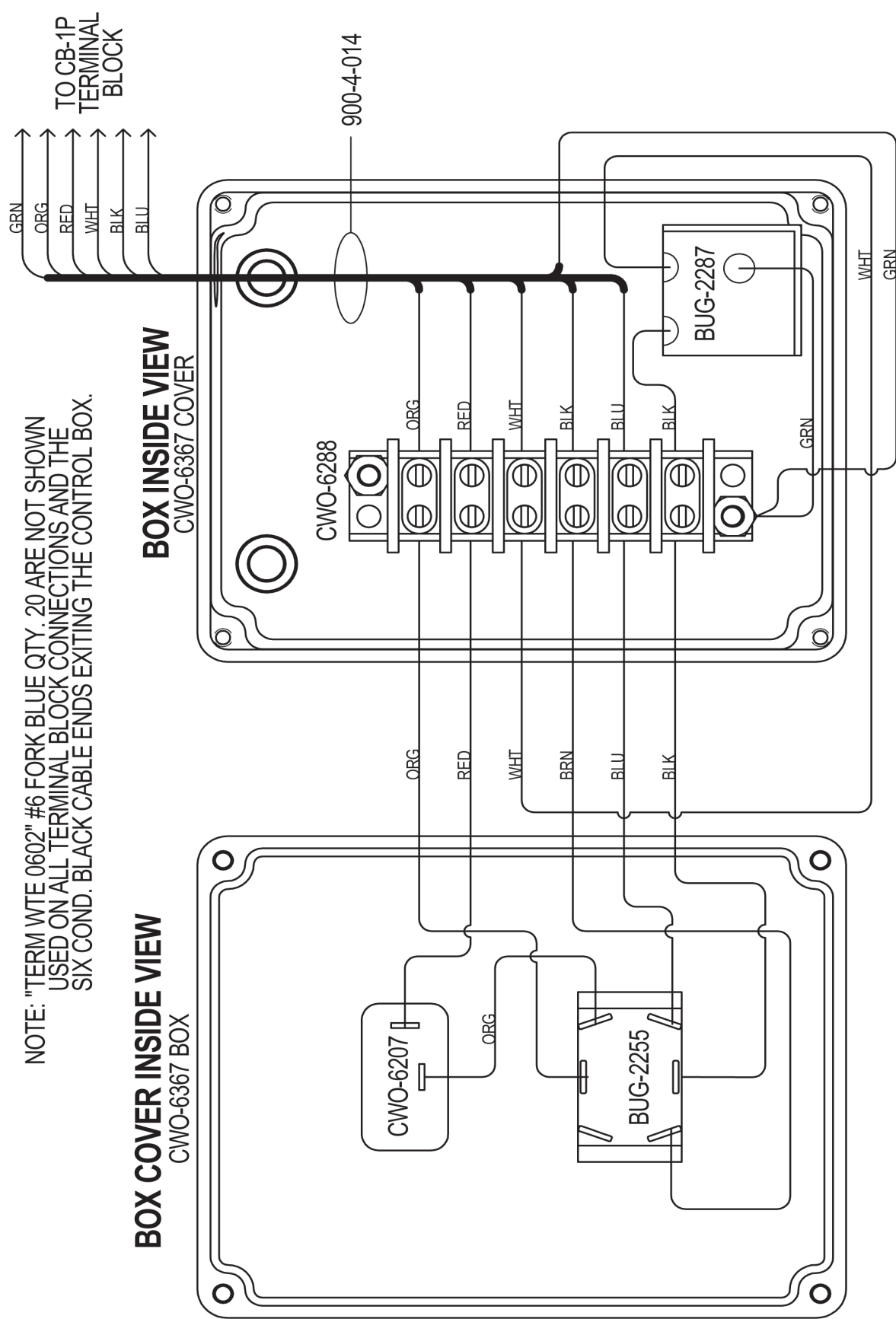


CWO-3951 PLASMA CONTROL BOX / EXPLODED VIEW / PARTS LIST

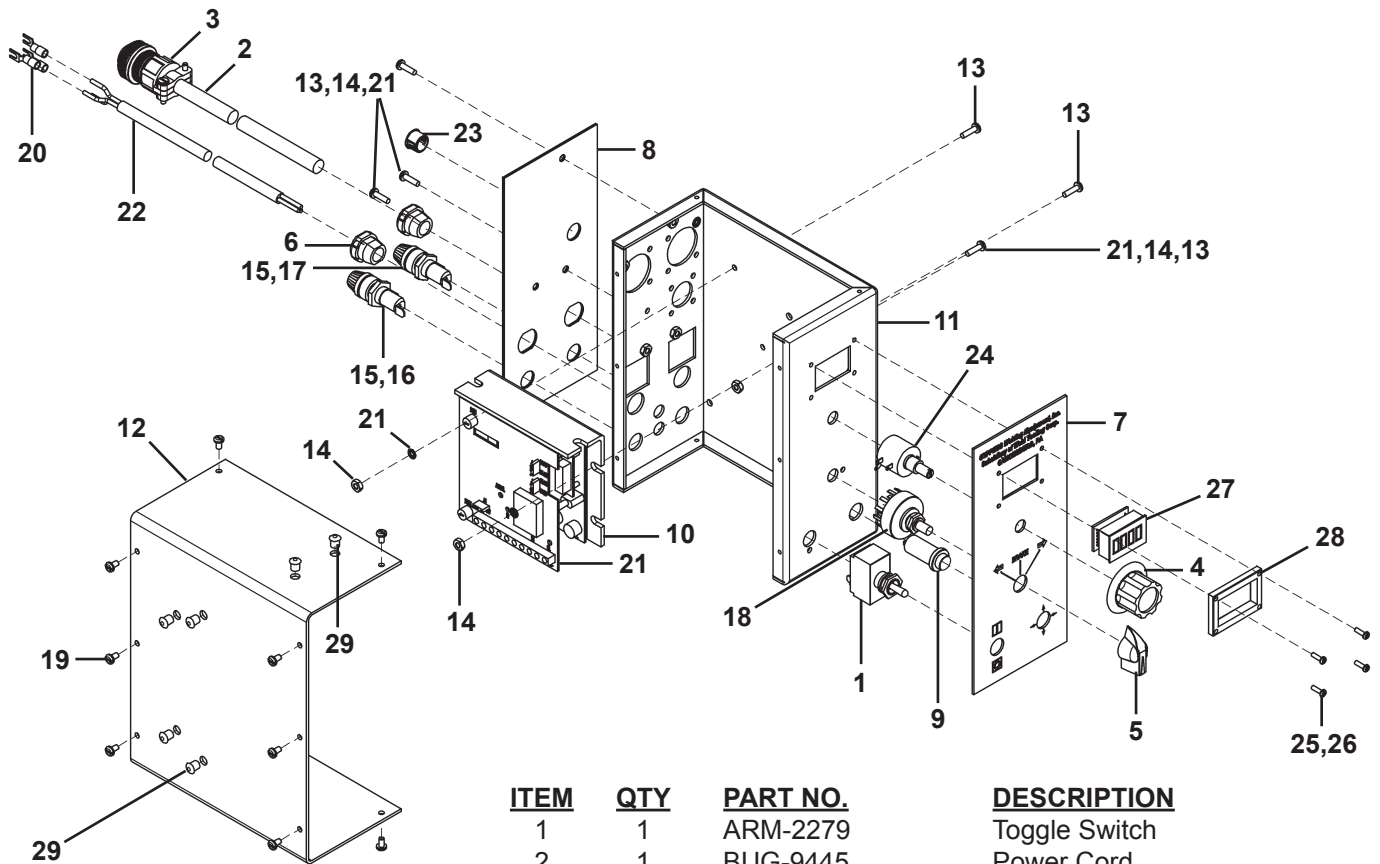


<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	BUG-2255	Toggle Switch
2	1	BUG-2287	Power Receptacle
3	1	CWO-5672	Cover Face Plate
4	1	CWO-6207	Toggle Switch On-Off
5	1	CWO-6288	Terminal Block
6	1	CWO-6367	Plasma Control Box
7	2	FAS-0115	Pan Hd Scr 6-32 x 1/2"
8	2	FAS-1310	Hex Nut 6-32
9	2	SCF-1023	Self-Clinching Nut 1/4-20
10	2	WAS-0211	#6 Star Lock Washer

CWO-3951 PLASMA CONTROL BOX / WIRING DIAGRAM

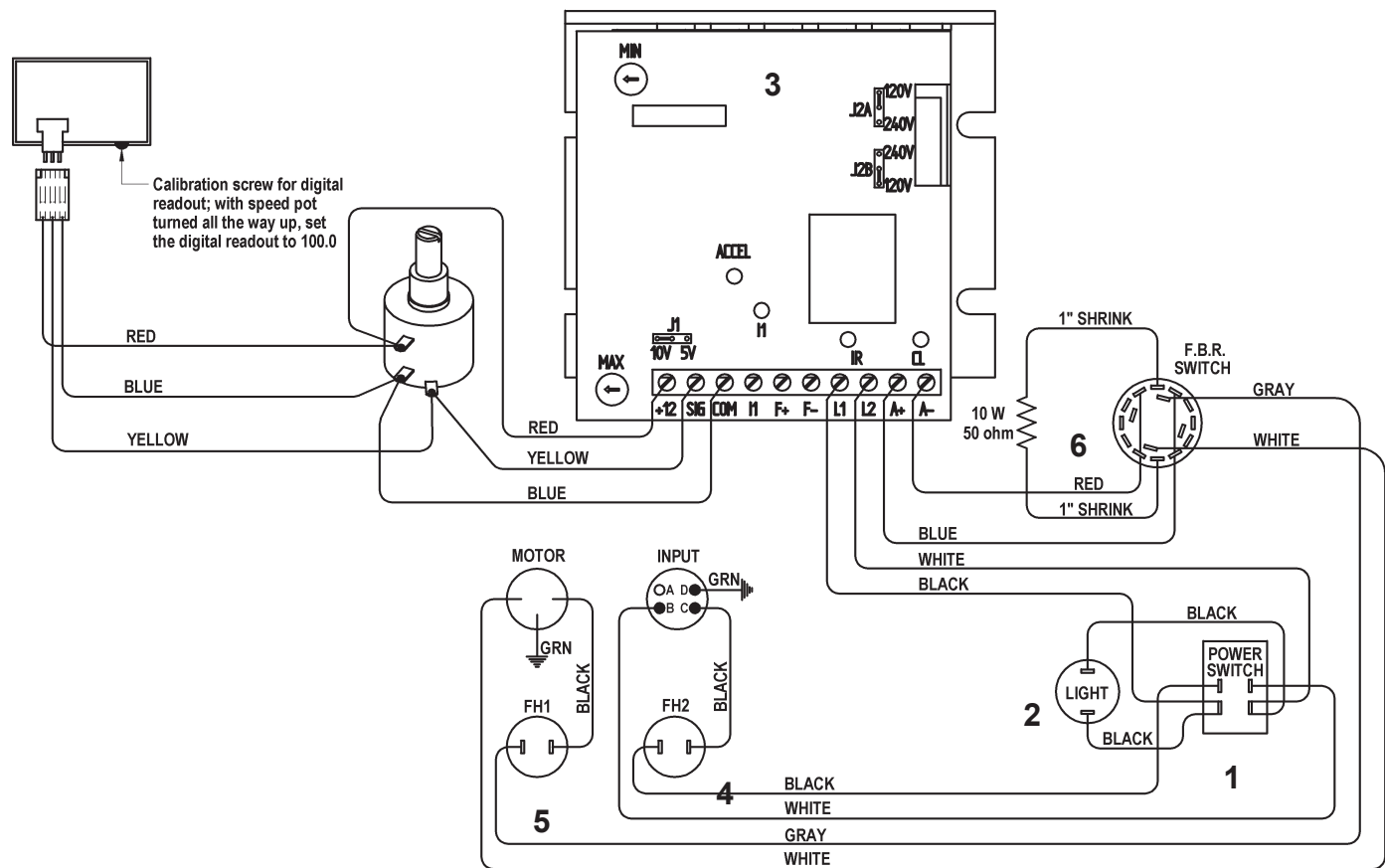


CWO-6210 ROTATION CONTROL / EXPLODED VIEW / PARTS LIST



ITEM	QTY	PART NO.	DESCRIPTION
1	1	ARM-2279	Toggle Switch
2	1	BUG-9445	Power Cord
3	1	CON-PS04M	Plug, Straight 4-Pin Male
4	1	BUG-9687	Knob Fluted
5	1	BUG-9694	Knob
6	2	CSR-WTE-1597	Cord Strain Relief
7	1	CWO-6216	Rotation Box Front Panel
8	1	CWO-5547B	Rotation Box Rear Panel
9	1	CWO-6206	Indicator Light
10	1	CWO-6527	0-90V Spd Ctrl w/Isolator
11	1	CWO-6839	Rotation Control Case
12	1	CWO-6802	Rotation Box Cover
13	6	FAS-0115	#6-32 x 1/2" Pan Head Zinc
14	6	FAS-1310	Hex Nut 6-32
15	2	FHO-0188	Fuse Holder
16	1	FUS-0190	Fuse 1.5 Amp
17	1	FUS-0257	Fuse 3 Amp
18	1	MUG-1258-1	Rotary Switch Assembly
19	10	SCW-WTE-0264	#6-32 x 1/4" Sht Mt Scr
20	3	TERM-WTE-0197	#6 Red Fork
21	6	WAS-0211	#6 Internal Star Washer
22	42"	WRE-WTE-0501	18/3 SJO 300V Cord
23	1	MUG-1589	Hole Plug .500"
24	1	BUG-1562	Multi-turn Potentiometer
25	4	FAS-0104	#4-40 X 3/8" Pan Hd
26	4	SCF-1001	#4-40 Self Clinching Nut
27	1	BUG-1764	Meter Display Board
28	1	MDS-1011	Display Bezel
29	6	BUG-3331	Hole Plug 1/4"

CWO-6210 ROTATION CONTROL / WIRING DIAGRAM / ELECTRICAL COMPONENT CHART

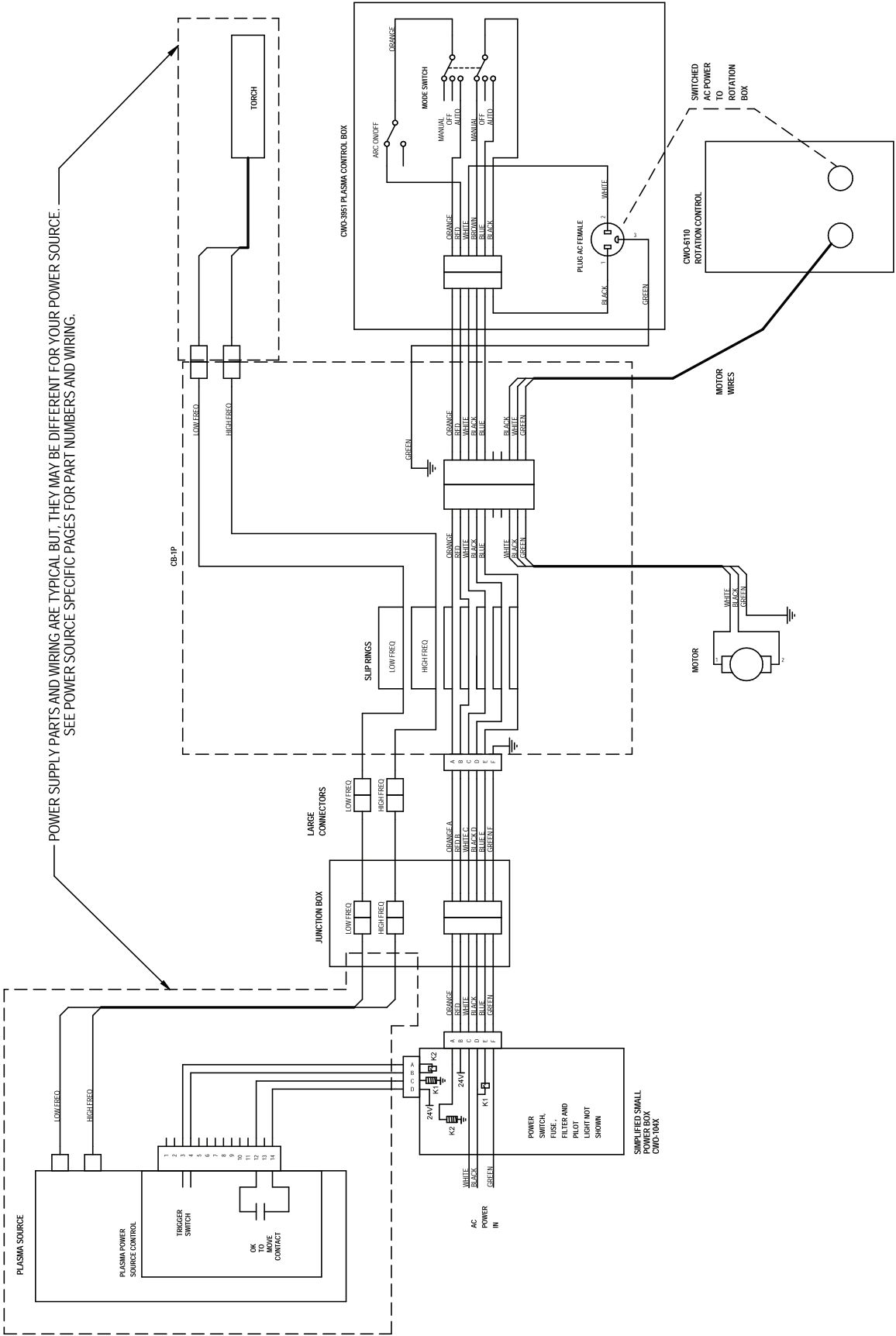


--- = INDICATES ITEMS THAT ARE SUPPLIED TOGETHER.

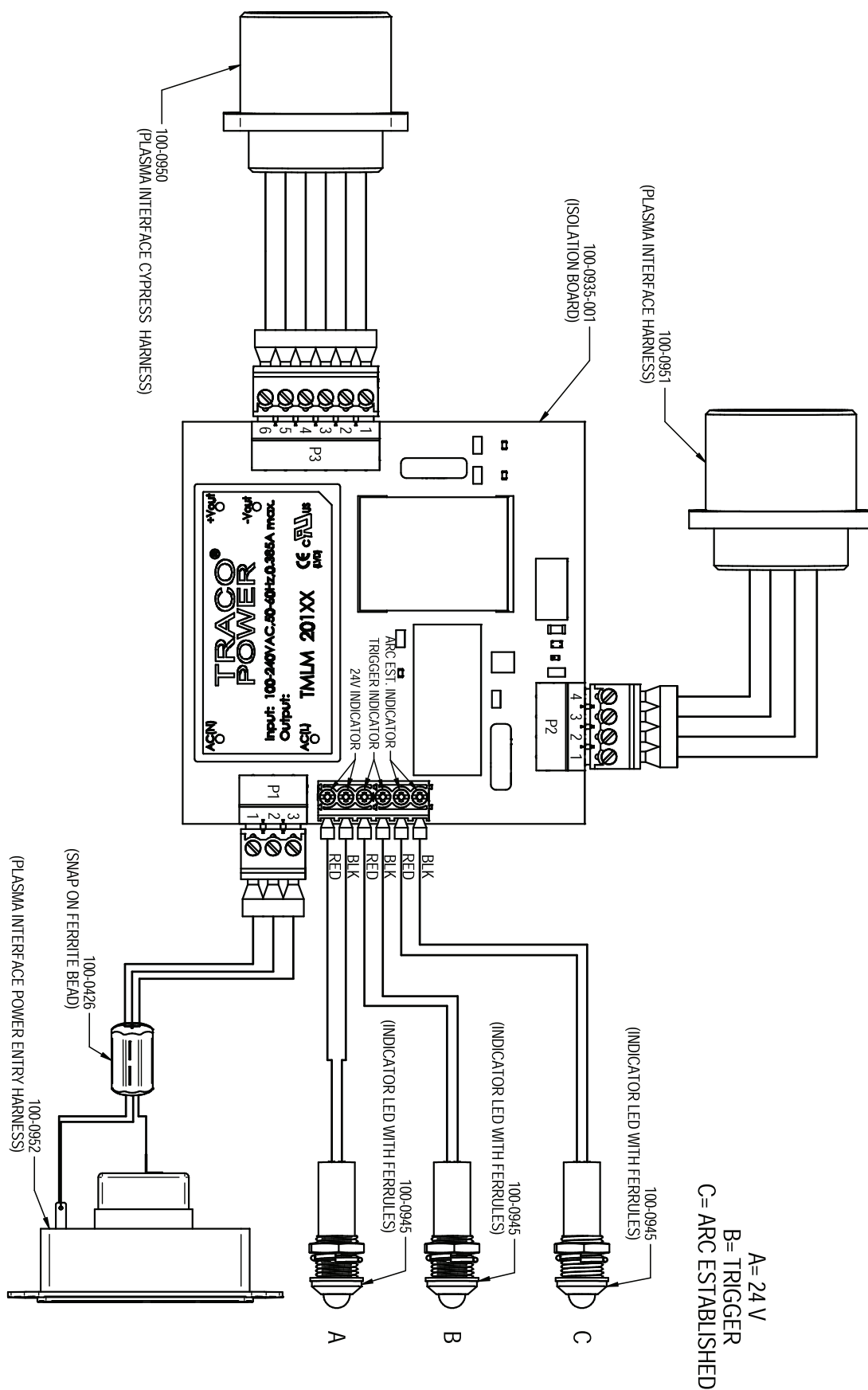
ELECTRICAL COMPONENT CHART

ITEM	DESCRIPTION	PART NO.
1	TOGGLE SWITCH	ARM-2279
2	RED NEON LAMP	CWO-6206
3	SPEED CONTROL BOARD W/RESISTOR	CWO-6525
4	FUSE 1.5 AMP	FUS-0190
5	FUSE 3 AMP	FUS-0257
6	ROTARY SWITCH	MUG-1258-1

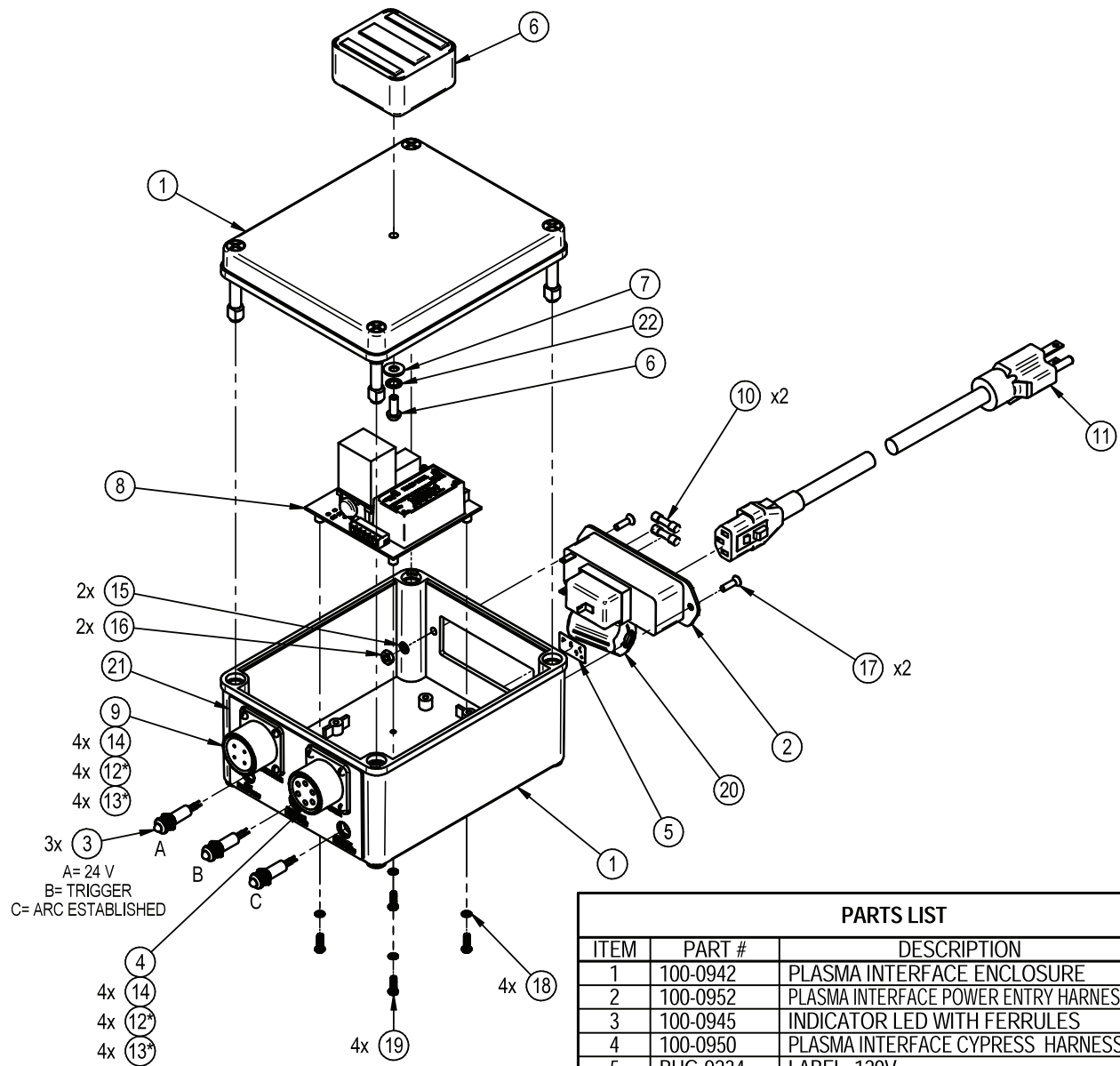
CONSOLIDATED WIRING DIAGRAM



28



CWO-1040 120V POWER BOX / EXPLODED VIEW / PARTS LIST

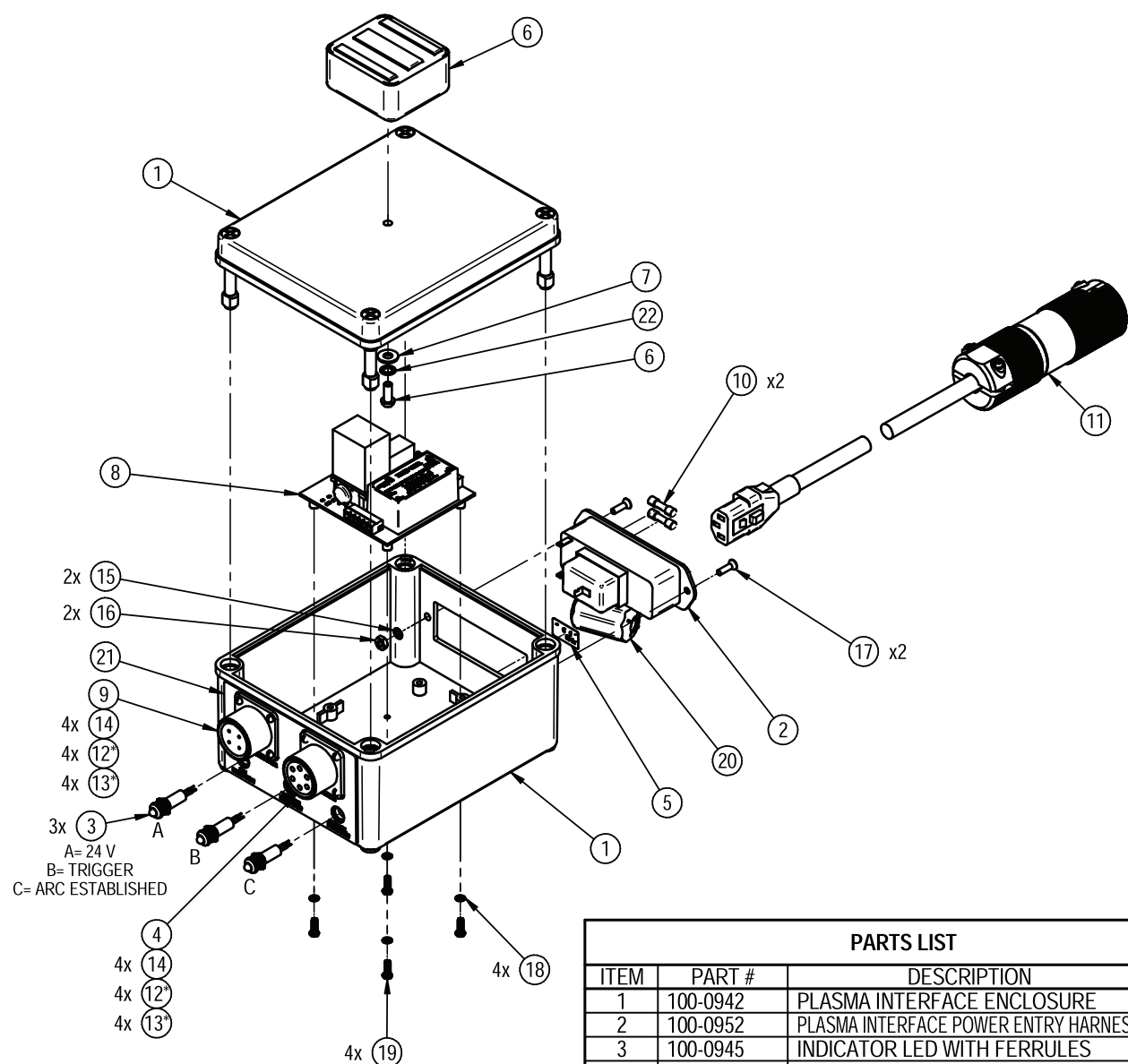


PARTS LIST

ITEM	PART #	DESCRIPTION	QTY
1	100-0942	PLASMA INTERFACE ENCLOSURE	1
2	100-0952	PLASMA INTERFACE POWER ENTRY HARNESS	1
3	100-0945	INDICATOR LED WITH FERRULES	3
4	100-0950	PLASMA INTERFACE CYPRESS HARNESS	1
5	BUG-9234	LABEL, 120V	1
6	ARM-2221	FIXED MAGNET	1
7	WAS-0230	#10 SAE FLAT	1
8	100-0935-001	ISOLATION BOARD	1
9	100-0951	PLASMA INTERFACE HARNESS	1
10	MPD-1027	FUSE, 3.15 AMPS	2
11	BUG-9454	V-LOCK 110VAC CORD 2M	1
12*	WAS-0201	#4 INTERNAL STAR LOCKWASHER	8
13*	FAS-1305	HEX NUT 4-40	8
14	FAS-0205	#4-40 X 1/2 ROUND HEAD, ZINC	8
15	WAS-0211	#6 INTERNAL STAR LOCKWASHER	2
16	FAS-1310	HEX NUT 6-32	2
17	FAS-0915	FLT HD SOC SCR 6-32 X 1/2	2
18	WAS-5541-SS	M3 INTERNAL STAR LOCK WASHER	4
19	MET-0143-SS	PAN HD PHIL M3 x 10	4
20	100-0426	SNAP ON FERRITE BEAD	1
21	100-0943	LEGEND PLATE	1
22	WAS-0231	#10 INTERNAL STAR LOCKWASHER	1

NOTE: WIRES, INTERNAL CONNECTORS AND ITEMS MARKED "*" NOT SHOWN.

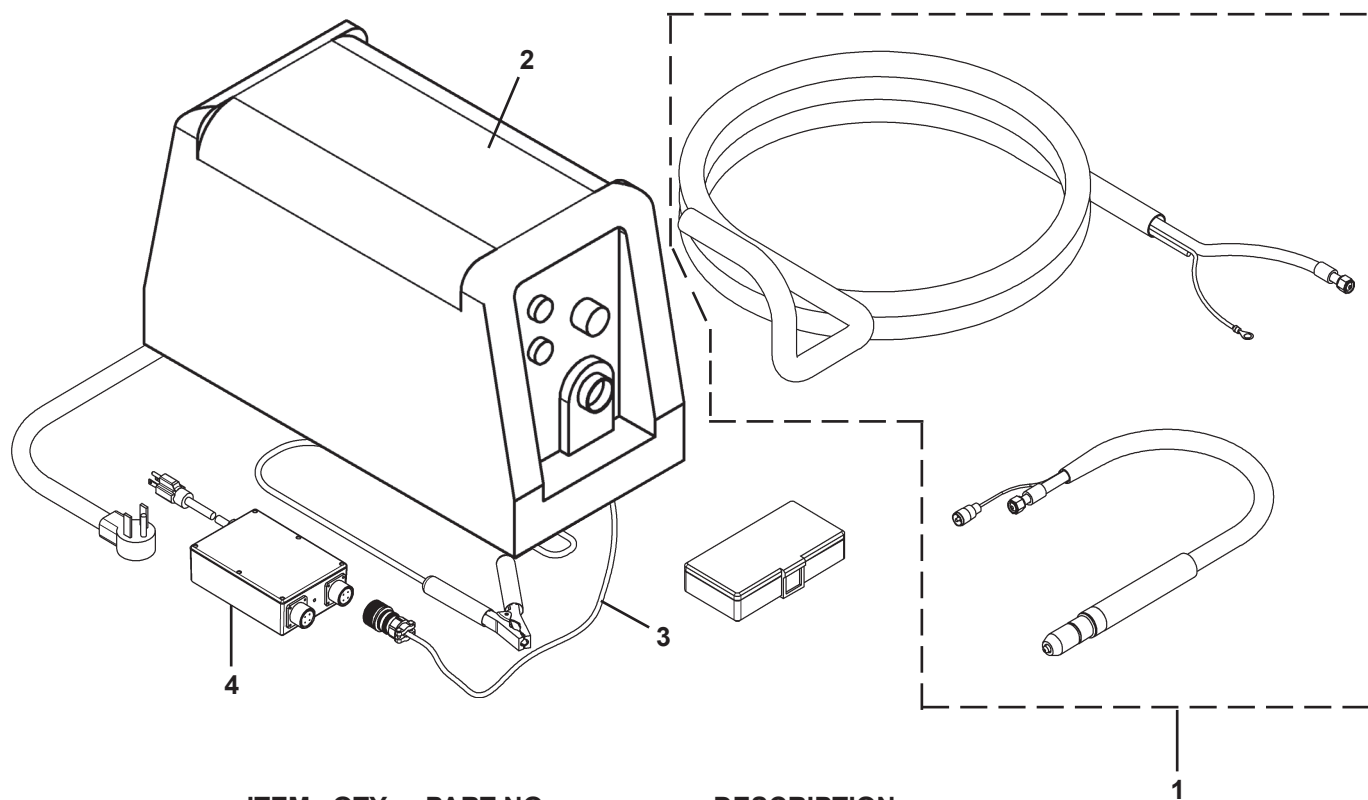
CWO-1042 240V POWER BOX / EXPLODED VIEW / PARTS LIST



PARTS LIST			
ITEM	PART #	DESCRIPTION	QTY
1	100-0942	PLASMA INTERFACE ENCLOSURE	1
2	100-0952	PLASMA INTERFACE POWER ENTRY HARNESS	1
3	100-0945	INDICATOR LED WITH FERRULES	3
4	100-0950	PLASMA INTERFACE CYPRESS HARNESS	1
5	BUG-9233	LABEL, 240V	1
6	ARM-2221	FIXED MAGNET	1
7	WAS-0230	#10 SAE FLAT	1
8	100-0935-001	ISOLATION BOARD	1
9	100-0951	PLASMA INTERFACE HARNESS	1
10	MPD-1027	FUSE, 3.15 AMPS	2
11	BUG-9454-240	V-LOCK POWER CORD, 240V	1
12*	WAS-0201	#4 INTERNAL STAR LOCKWASHER	8
13*	FAS-1305	HEX NUT 4-40	8
14	FAS-0205	#4-40 X 1/2 ROUND HEAD, ZINC	8
15	WAS-0211	#6 INTERNAL STAR LOCKWASHER	2
16	FAS-1310	HEX NUT 6-32	2
17	FAS-0915	FLT HD SOC SCR 6-32 X 1/2	2
18	WAS-5541-SS	M3 INTERNAL STAR LOCK WASHER	4
19	MET-0143-SS	PAN HD PHIL M3 x 10	4
20	100-0426	SNAP ON FERRITE BEAD	1
21	100-0943	LEGEND PLATE	1
22	WAS-0231	#10 INTERNAL STAR LOCKWASHER	1

NOTE: WIRES, INTERNAL CONNECTORS AND ITEMS MARKED ** NOT SHOWN.

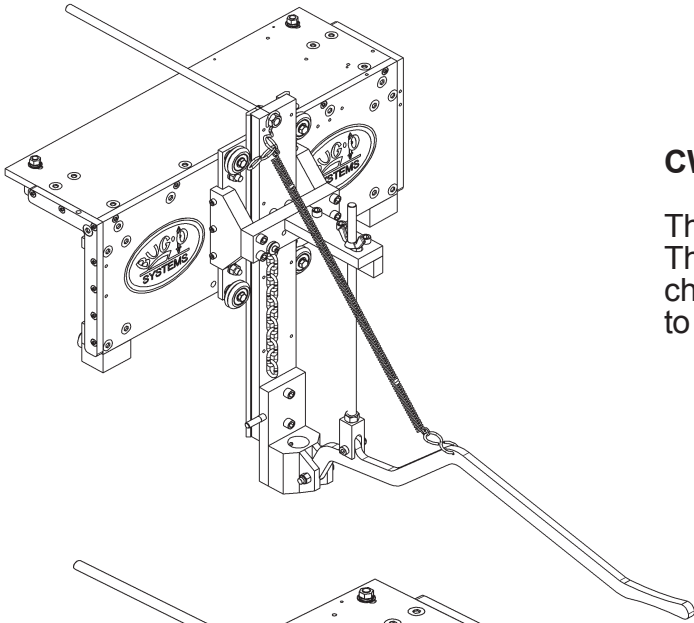
POWER SUPPLY REPLACEMENT COMPONENTS



<u>ITEM</u>	<u>QTY</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>
1	1	CWO-7596-50-CB-1P	50ft Machine Torch Hypertherm
2	1		CB-1P Plasma Power Source
3	1	CWO-1045-3	Plasma CB-1P Interface Cable
4	1	CWO-1050	120V Power Box

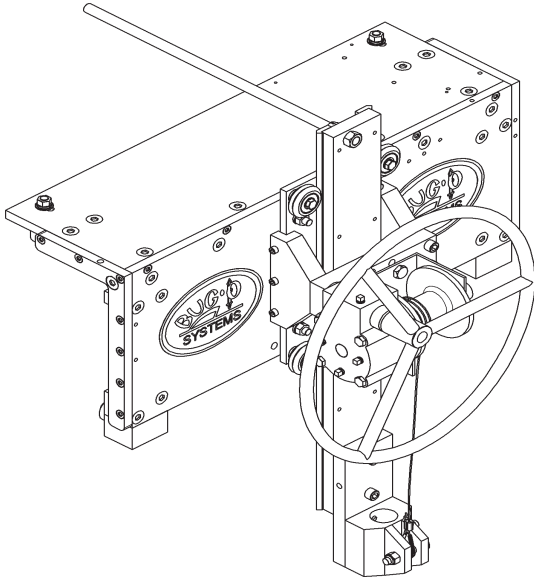
Note: For consumable chart, see Powermax 65 or 85 instruction manual.

CARRIAGES



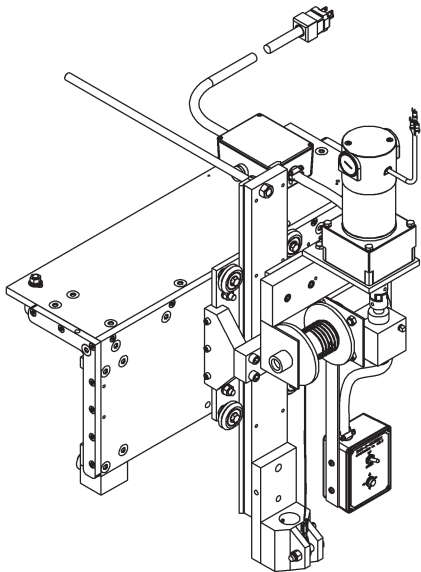
CWO-4530 151 Carriage

The 151 Carriage mounts on a standard monorail. The carriage allows the operator to move the machine the length of the pipe, while utilizing a lever to position the machine vertically on the work piece.



CWO-4540 151P Carriage

The 151P Carriage mounts on a standard monorail. The carriage allows the operator to move the machine the length of the pipe, while utilizing a winch to position the machine vertically on the work piece.



CWO-4550 151M Carriage

The 151M Carriage mounts on a standard monorail, or “bridge crane” type setups. The carriage allows the operator to move the machine the length of the pipe, while utilizing an electric motor to mechanically position the machine vertically on the work piece.

SET-UP INSTRUCTIONS FOR CW-5 / CB-1P USED IN SPRINKLER FABRICATION

SUPPORTING FIXTURE AND PIPE STANDS

The first priority should be given to where the fixture is to be placed. The burning of the holes and welding of the couplings should be the last part of the operation performed on the pipe. It is important that a flow pattern or line be looked at, so that when the pipe is taken out of the fixture, it is finished and ready for shipment.

The mono rail consists of a 4" x 8" x 1/4" wall rectangular tubing with a 3/8" x 3" flat bar welded to the tubing (See pg. 30). The flat bar has to project 1" above the top of the tubing. "C" clamps are to be used to hold the flat bar against the tubing with no gaps. The "C" clamp may be walked down the tubing as it is being tack welded. If the beam has a bow greater than 1/32" in a 30' span, take to following steps:

1. Determine exactly where the center of the bow is. This may be accomplished by putting a string along the front side of the monorail. Place 1/2" nuts between the string and the monorail and measure the gap between the string and the monorail. Always measure on the same side of the string.
2. After you have determined where center of the bow is, take a hand torch and heat the outside of the bow. The outside of the bow should be the side the flat bar is welded to. Take a piece of chalk and draw a triangle with a 2" base under the bottom of the flat bar with the top or point of the triangle pointing down. Do the same on the top of the monorail against the flat bar with the top or point pointing towards the face of the monorail. Heat these two areas so that they become cherry red in color. After the heat has been applied, take a large rag and a bucket of water and cool the heated area. After the area has been cooled, check the beam again. Repeat as necessary.

PIPE STANDS

The pipe stands consist of 3" pipe in floor flanges with a 2-1/2" or 3" angle welded to the top of the pipe, and they should be spaced and aligned as shown (See pg. 30). The two stands should have some sort of clamping device to hold the pipe in place. The clamping device can be anything from a pipe vise to a chain and boom. The clamping device must be staggered.

After the pipe stands and supporting columns are in place, the monorail is to be placed on the supporting columns. The pipe stands and the supporting columns must be level and plumb. These items may have to be shimmed. With these items level, the monorail may be put in place on the supporting columns and held in place by two "C" clamps. Put a level on the face of the beam in the vertical position and on the bottom in the horizontal position. The beam should be level both ways, and if not, the beam will have to be shimmed. If the monorail has a twist, which may occur, level one end so that the other end needs to be pulled back.

Next, put a piece of 8" pipe in the pipe stands and clamp down. Take a centering head and find the center of the pipe on each end and in the middle. You can now use two methods to check to see if the monorail is aligned with the pipe below. They are as follows:

1. Use a plumb bob off the face of the monorail and measure from the center of the pipe to the plumb bob. The distance should be 5-11/16" in all three locations.
2. The second method is to put one carriage on the monorail and attach the CB-1P to it. With the center pin in the burning machine, check all three locations. The burning machine must be plumb on the carriage if this method is used.

SETUP INSTRUCTIONS FOR CW-5 / CB-1P USED IN SPRINKLER FABRICATION

INSTALLING CARRIAGES AND MACHINES ON THE MONORAIL

Assemble carriages and put them on the rail.

The CW-5 welder is put on the carriage that is nearest to the welding power source and the CB-1P cutter nearest to the plasma power source.

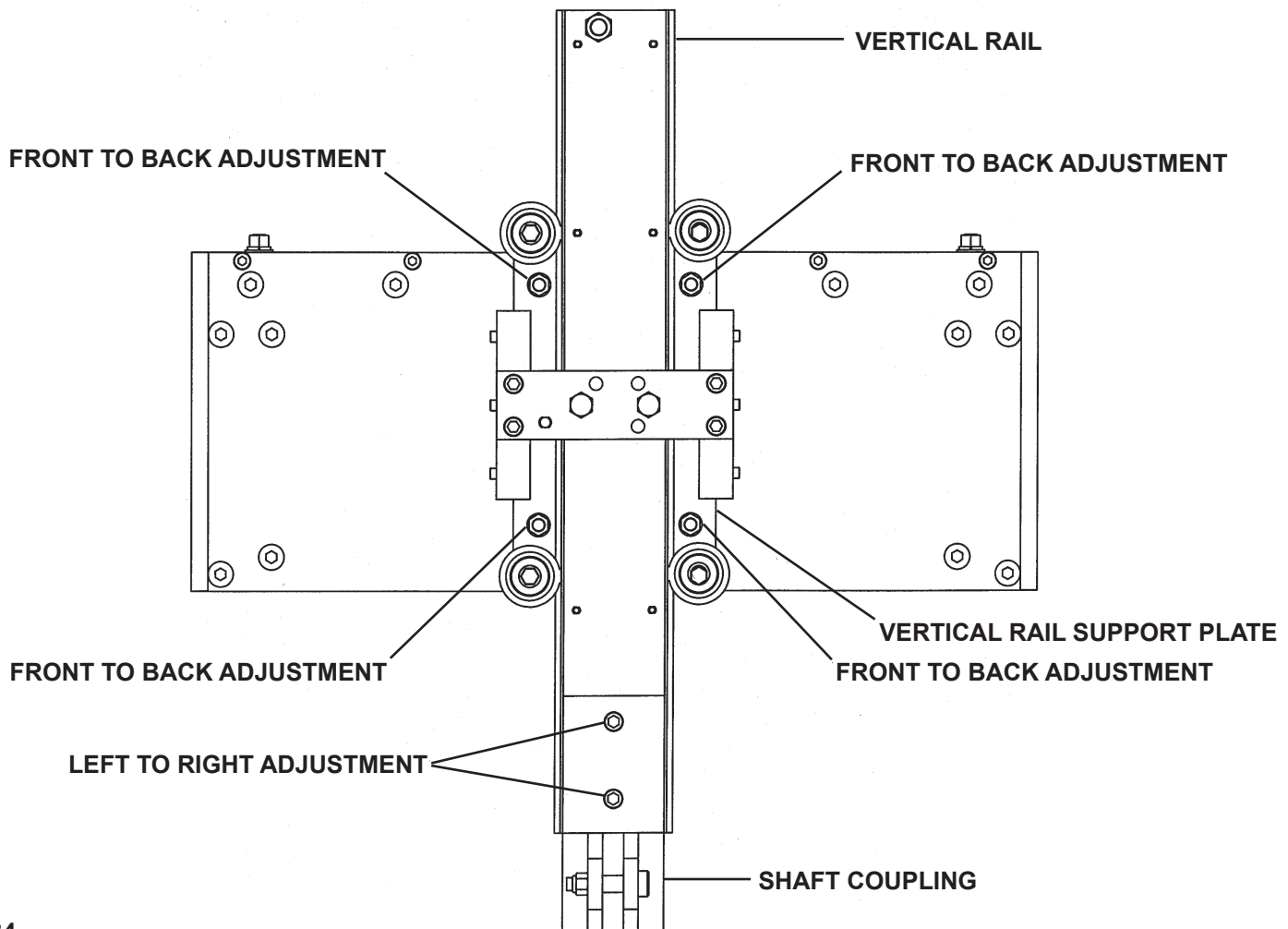
Put the CB-1P cutter machine on the 8" pipe in the stands and bring the carriage to the machine. Lower the shaft coupling over the main shaft on the cutter. Ensure that shaft is fully inserted into the shaft coupling. Rotate the machine so that the plasma leads are in front and parallel to the carriage and tighten the set screws in the shaft coupling to secure the main shaft to the vertical slide assembly.

Next put the CW-5 welder on the 8" pipe and bring its carriage to it. Lower the shaft coupling down over the main shaft. Rotate the machine so that the welding lead on top of the machine will be on your left. This will put the electrical connector on the right. Tighten the set screws in the shaft coupling to secure the main shaft to the vertical slide assembly.

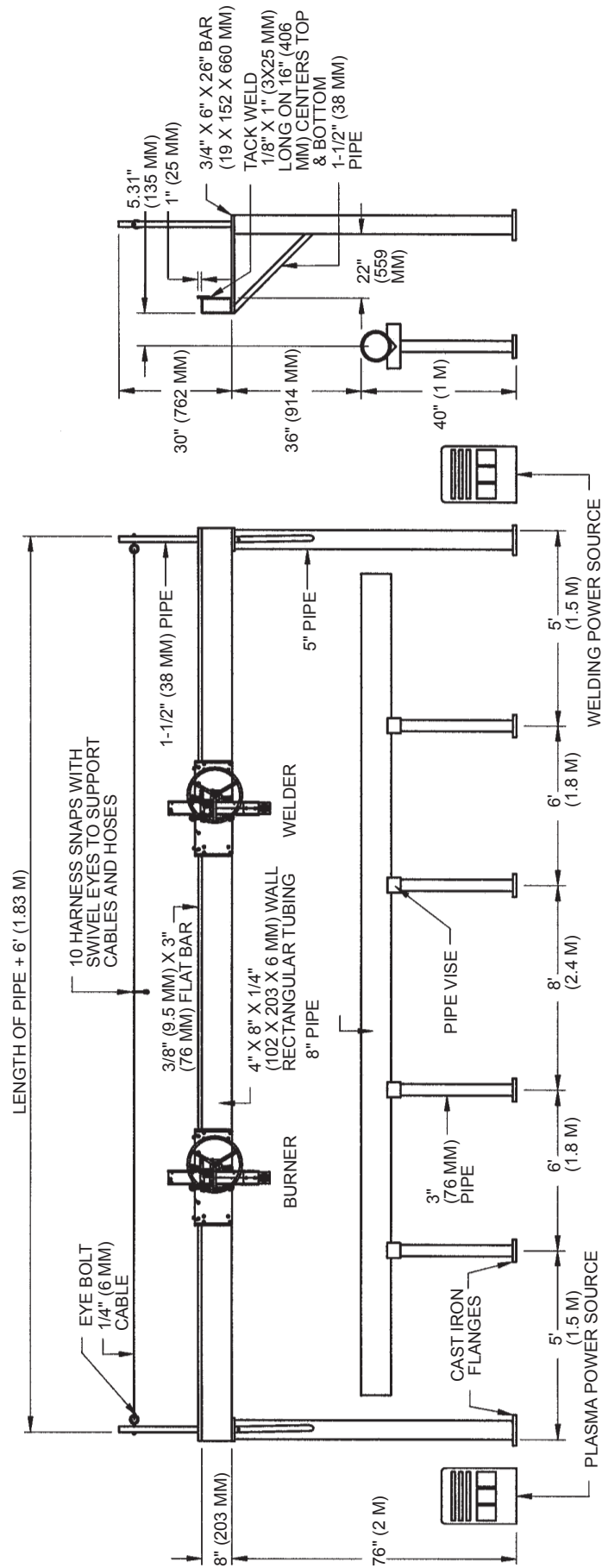
It is important for the machines to hang plumb. Left to right adjustments are made by loosening the two bolts that connect the shaft coupling to the vertical rail. Front to back adjustments are done by adjusting the position of the vertical rail support plate. Move the plate by adjusting the eight nuts on the four studs.

Note: Once machines are plumb verify that the machines are centered over the pipe stand.

CARRIAGE ADJUSTMENT



SET-UP DIAGRAM FOR CW-5 / CB-1P USED IN SPRINKLER FABRICATION



PREVENTIVE MAINTENANCE FOR CB-1P PLASMA CIRCLE BURNER

CAUTION: Make sure the input power at the power source is turned off and the high and low frequency power cables, and the 50' control cable (Items # 2, 3, 10, on the CB-1P Electrical Wiring Diagram) are disconnected from the circle burner prior to working inside the machine.

POWER SUPPLY: Refer to the Thermal Dynamics Cut Master 82 Plus Plasma Cutting Power Supply operating manual # 0-4979 supplied with this machine for general maintenance procedures and replacement parts.

PLASMA TORCH: Refer to the Thermal Dynamics Plasma Cutting Torch model PCM-102 machine torch instruction manual # 0-2818 supplied with this machine for general maintenance procedures and replacement parts.

AFTER DAILY USE:

Refer to CB-1P Exploded View / Parts List. (Page 13)

Racking System Item # 1: Inspect gear rack; hardened ways and wheels (remove all dirt, grease, and rust). Check hardened ways for nicks and replace if necessary. Lubricate with a dry spray lubricant. Adjust wheels for snug fit and smooth operation. Lubricate racker pinion with a dry Teflon or graphite spray lubricant.

Small Vertical Racker Item # 2: Inspect wheels (remove all dirt, grease, and rust). Adjust wheels for snug fit and smooth operation. Lubricate racker pinion and wheels with a dry Teflon or graphite spray lubricant.

Slide Bar Mounting Assembly Item # 10: Inspect hardened ways (remove all dirt, grease, and rust). Check hardened ways for nicks and replace if necessary.

Refer to CB-1P Electrical Wiring Diagram. (Page 14)

Control Cable Item # 10: Inspect cable connector to make sure threads are not stripped and that the connector is not cracked. Check the cable for cuts, missing insulation, and burn spots replace if necessary.

CB-1P Collector Ring Item # 9: Inspect cable connector to make sure threads are not stripped and that the connector is not cracked. Ensure that the connector is fastened properly to the large aluminum gear (item # 30, page 12).

EVERY SIX MONTHS:

Refer to CB-1P Wiring Diagram. (Page 13)

Aluminum Gear Item # 30: Do not grease this gear. Inspect gear teeth (remove all dirt and grease). Lubricate with a dry Teflon or graphite spray lubricant. Replace gear if excessively worn.

P.M. Motor Assembly Item # 9: Do not grease this pinion. Inspect the drive pinion (remove all dirt, grease, and rust). Lubricate with a dry Teflon or graphite spray lubricant. Replace pinion if excessively worn. Check set screw and tighten if necessary. Adjust motor assembly using the four adjustable mounting fasteners so that proper gear mesh is achieved between the aluminum gear (item # 30) and the motor drive pinion.

5" Cam Assembly Item # 4: Inspect the slide rails and the cam pinion (remove all dirt, grease, and rust). Do not grease slide rails or cam pinion. Lubricate with a dry Teflon or graphite spray lubricant. Replace cam pinion if excessively worn. Tighten all fasteners as needed.

Refer to CB-1P Electrical Component Chart. (Page 14)

M-14 Rotation Control: Open control box use an air hose to blow out dust and dirt. Check all wires for breaks and replace if necessary. Check all electrical connectors and plugs if an electrical component fails refer to CWO-6210 Rotation Control electrical component chart for replacement parts or return for service.

Large Brush Holder & Support: Inspect brush holder. Make sure constant tension is being applied on the brushes. Brushes should move freely within the brush holder. Check brushes for arc build up. If brushes are pitted they will need replaced. Remove the brushes and sand them to ensure a smooth contact surface. Make sure all fasteners are tight.

High Frequency Brush Holder: Inspect brush holder. Make sure constant tension is being applied on the brush. The brush should move freely within the brush holder. Check the brush for arc build up. If the brush is pitted it will need replaced. Remove the brush and sand it to ensure a smooth contact surface. Make sure all fasteners are tight.

Small Brush Retainer Assembly: Inspect black brush holders for cracks and replace if needed. Check and make sure all wires are soldered properly to the holders. Replace the brushes when their length is less than ½ inch long. Remove the brushes and sand them to ensure a smooth contact surface. Make sure all fasteners are tight.

Terminal Block: Inspect the plastic terminal strip make sure it is not cracked, replace if necessary. Make sure all terminal connections are tight. Make sure all ground wires are connected to the mounting screws of the terminal strip.

EVERY TWELVE MONTHS:

Refer to CB-1P Exploded View Parts List. (Page 13)

1" Bearing with Fasteners Item # 21: Do not grease the bearing it is greased for life by the manufacturer. If the grease fitting has not been removed and plugged we suggest that you do so now. Earlier models may not have been plugged at time of assembly.

1-1/4" Bearing with Fasteners Item # 22: Do not grease the bearing it is greased for life by the manufacturer. If the grease fitting has not been removed and plugged we suggest that you do so now. Earlier models may not have been plugged at time of assembly.

P.M. Motor Assembly Item # 9: Bodine gear motor lubrication. Fill gear motor to oil level indicator with worm gear oil conforming to AGMA#5EP compounded (SAE#90) oil or Bodine lubricant #LO-23. Do not overfill.

Transmission 3.5:1 Assembly Item # 8: Inspect for excessive wear and tear. Keep the transmission assembly clean and lubricate with Lubriplate #630-AA.

Refer to CB-1P Wiring Diagram. (Page 14)

CB-1P Collector: The collector ring should be sanded once a year. If the collector ring is pitted too badly it should be replaced. Inspect all wires coming out of the collector ring for cut or missing insulation. All wires should be fastened to the center shaft with a nylon cable tie. Tighten four set screws if needed.

Manifold Power Cable: Ensure that the cable is fastened tightly to the large brush holder and the manifold retainer. Inspect the cable for cut or missing insulation. Replace the cable if necessary.

Manifold Retainer: Inspect for damage. Ensure that all cables and the oxygen hose are fastened tightly. Inspect the cables and oxygen hose for cuts or missing insulation. Replace if necessary.

Junction Box: Inspect the cables for cuts or missing insulation. Ensure that all terminal ends and connections are snug. Replace if necessary.

Low Frequency Power Cable: Inspect the cable for cut or missing insulation. Ensure that the micarta insulator is in good condition. Replace if necessary.

High Frequency Power Cable: Inspect the cable for cut or missing insulation. Ensure that the micarta insulator is in good condition. Replace if necessary.

WARRANTY

Limited 3-Year Warranty*

MODEL _____
SERIAL NO. _____
DATE PURCHASED: _____
WHERE PURCHASED: _____

For a period ending one (1) year from the date of invoice, Manufacturer warrants that any new machine or part is free from defects in materials and workmanship and Manufacturer agrees to repair or replace at its option, any defective part or machine. HOWEVER, if the invoiced customer registers the Product Warranty by returning the Warranty Registration Card supplied with the product within 90 days of the invoice date, or by registering on-line at www.bugo.com, Manufacturer will extend the warranty period an additional two (2) years which will provide three (3) total years from the date of original invoice to customer. This warranty does not apply to machines which, after Manufacturer's inspection are determined by Manufacturer to have been damaged due to neglect, abuse, overloading, accident or improper usage. All shipping and handling charges will be paid by the customer.

The foregoing express warranty is exclusive and Manufacturer makes no representation or warranty (either express or implied) other than as set forth expressly in the preceding sentence. Specifically, Manufacturer makes no express or implied warranty of merchantability or fitness for any particular purpose with respect to any goods. Manufacturer shall not be subject to any other obligations or liabilities whatsoever with respect to machines or parts furnished by Manufacturer.

Manufacturer shall not in any event be liable to Distributor or any customer for any loss of profits, incidental or consequential damages or special damages of any kind. Distributor's or customer's sole and exclusive remedy against Manufacturer for any breach of warranty, negligence, strict liability or any other claim relating to goods delivered pursuant hereto shall be for repair or replacement (at Manufacturer's option) of the machines or parts affected by such breach.

Distributor's Warranty:

In no event shall Manufacturer be liable to Distributor or to any customer thereof for any warranties, representations or promises, express or implied, extended by Distributor without the advance written consent of Manufacturer, including but not limited to any and all warranties of merchantability or fitness for a particular purpose and all warranties, representations or promises which exceed or are different from the express limited warranty set forth above. Distributor agrees to indemnify and hold Manufacturer harmless from any claim by a customer based upon any express or implied warranty by Distributor which exceeds or differs from Manufacturer's express limited warranty set forth above.

HOW TO OBTAIN SERVICE:

IF YOU THINK THIS MACHINE IS NOT OPERATING PROPERLY, RE-READ THE INSTRUCTION MANUAL CAREFULLY, THEN CALL YOUR AUTHORIZED BUG-O DEALER/DISTRIBUTOR. IF THEY CANNOT GIVE YOU THE NECESSARY SERVICE, WRITE OR PHONE US TO TELL US EXACTLY WHAT DIFFICULTY YOU HAVE EXPERIENCED. BE SURE TO MENTION THE MODEL AND SERIAL NUMBERS.

*Bug-O System's warranty applies to Bug-O components only. Where other brands of power sources, wire feeders or sub components are a part of Bug-O Equipment, please refer to that specific Manufacturer's manual for warranty specifications on their components.

NOTES: